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INDIAN AGRICULTURAL
RESEARCH INSTITUTE, NEW DELHI

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The Journal
of the
Department of Agriculture
of
South Australia

Issued under the Authority of the Minister of Agriculture

Volume XL.—August, 1936, to July, 1937

ADELAIDE: FRANK TRIGG, Government Printer, North Terrace
1937

The Journal

of the

Department of Agriculture

1936-37

Volume XL.

JOURNAL
OF THE
Department of Agriculture
OF
South Australia

Vol. XL. AUGUST, 1936 No. 1

Published Monthly by the Department of Agriculture Edited by H. C PRITCHARD

	Page
The Agriculture of New Zealand	3-11
Activities at Roseworthy Agricultural College, 1935-36	12-24
Wind Erosion of Soils in the Agricultural Areas	25-40
Widespread Aphid attack on Artichokes	41
"Centaurea Nigrescens," Willd., A New Plant	44
Mottle Leaf in Citrus	45-46
Egg-laying Competitions	47-48
Agricultural Bureau of South Australia—Conferences	49-50
Advisory Board	51
Papers Read at Conferences	52-74
Rainfall Table	75-76
Bureau Reports	77-93

WOMEN'S BRANCHES.

Bureau Reports	94-108

All communications to be addressed:
"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1936

Murray Lands (East), at Alawoona, Tuesday, 6th October (Mr. Angus Thomson, Alawoona).

Eyre's Peninsula (Lower), at Yeelanna, Wednesday, 21st October (Mr. R. R. Wilson).

Eyre's Peninsula (Central), at Minnipa, Friday, 23rd October (Mr. H. E. Broad).

Fruit (non-irrigated), at Greenock, Tuesday, 3rd November (Mr. A. Schubert, Greenock).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Naracoorte Sheep Show, Tuesday, 15th September.
Saddleworth, Saturday, 19th September.
Wudinna, Wednesday, 23rd September.
Gawler, Saturday, 26th September.
Waikerie, Saturday, 26th September.
Balaklava and Dalkey, Saturday, 26th September.
Eudunda, Wednesday, 30th September.
Laura, Wednesday, 30th September.
Wirrulla, Friday, 2nd October.
Kapunda and Light, Saturday, 3rd October.
Burra Burra, Saturday, 3rd October.
Kadina, Saturday, 3rd October.
Karoonda, Wednesday, 7th October.
Murray Bridge, Thursday, 8th October.
Cleve, Saturday, 10th October.
Moonta, Saturday, 10th October.
Blyth and Kybunga, Saturday, 10th October.
Loxton, Wednesday, 14th October.
Kimba, Wednesday, 14th October.
Colton, Wednesday, 14th October.
Yallunda Flat, Wednesday, 14th October.
Penola, Wednesday, 14th October.
Strathalbyn, Wednesday, 14th October.
Tailem Bend, Saturday, 17th October.
Mannum, Saturday, 17th October.
Paruna (Brown's Well), Saturday, 17th October.
Maitland, Wednesday, 21st October.
Pinnaroo, Wednesday, 21st October.
Mount Gambier, Wednesday and Thursday, 21st and 22nd October.
Willunga, Thursday, 22nd October.
Clare, Saturday, 24th October.
Port Elliot, Saturday, 24th October.
Kingston (South-East), Saturday, 24th October.
Minlaton (Central Yorke Peninsula), Wednesday, 28th October.
Tatiara (Bordertown), Wednesday and Thursday, 28th and 29th October.
Yankalilla, Saturday, 31st October.
Millicent, Saturday, 31st October.
Naracoorte Show, Wednesday, 4th November.
Kingscote, Kangaroo Island, Thursday, 5th November.
Mount Barker, Saturday, 7th November.
Woodside, Saturday, 14th November.
Kalangadoo, Saturday, 14th November.
Onkaparinga, Saturday, 14th November.

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The Agriculture of New Zealand

[By R. C. Scott, Chief Agricultural Instructor.]

(Continued from page 1459 *July issue.)*

Pigs in New Zealand.

As New Zealand barely grows enough grain for her own requirements, supplementary food for pigs over and above by-products from dairies, butter and cheese factories is expensive, and the pig industry has not, therefore, expanded to any great extent.

In 1934 there were 660,393 pigs in the Dominion, but comparatively with the number of dairy cows this is a low figure.

There is a large quantity of dairy by-products available, but despite the fact that pigs are the most useful animals for the disposal of these foods, many farms make no use of such by-products, and the pig-raising industry is not very important.

This is chiefly because grain foods are expensive, and of the high death rate of winter-bred pigs. Statistics show that 80 per cent. of the breeding sows produce only one litter per year.

Pig raising is practically always associated with dairying, and 75 per cent. of the animals are found in the dairying centres, namely, Auckland, Taranaki and Wellington Provinces.

The Berkshire is the most popular type, approximately 80 per cent. of the pure bred animals being of this breed. Next in favour is the Tamworth, and it is a cross between these animals that yields the moderately long-bodied pig, with rapid fattening characteristics, which is most in demand in New Zealand. Approximately 80 per cent. of the pig population is represented by animals of this cross, whilst the Yorkshire or Yorkshire crossbred pigs are not often seen, because this breed appears to be somewhat delicate under New Zealand climatic conditions.

Because of the scarcity of grain, pigs finish best as porkers, and the export trade is mainly in the form of pork. A small proportion of the frozen pork shipped is made into bacon in England, but except for a little forwarded to the Pacific Islands, there is practically no export of bacon from New Zealand. The local consumption of pork and bacon is high, and in 1934, 421,307cwts. were consumed at home, and 378,760cwts. exported. New Zealand is one of the largest suppliers of frozen pork to the United Kingdom, and at one time exported considerable quantities to Australia, but nowadays we are no longer a buyer, and in fact the Commonwealth is a serious competitor in the overseas market.

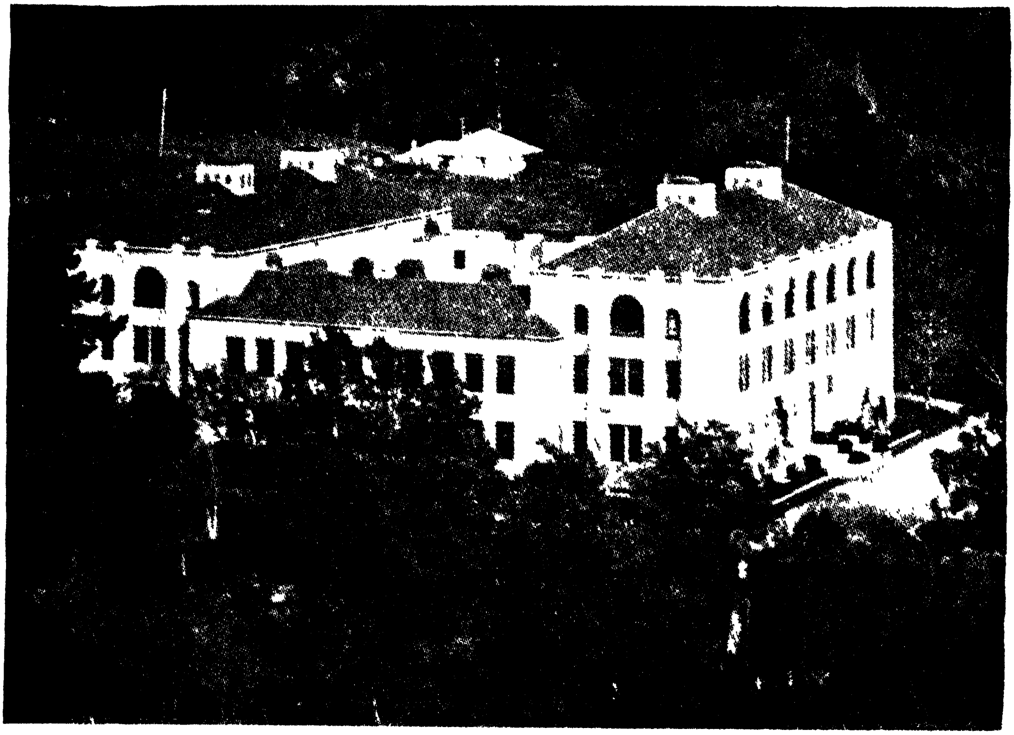
This season, New Zealand has imported a large amount of barley from South Australia for feeding to pigs as an addition to the skim milk, buttermilk, and whey that is available, but generally speaking it is doubtful if the Dominion will expand to any great extent in the pig-raising industry whilst supplementary foods remain as expensive as is the case at present.

About 80 per cent. is grown in the Canterbury district and practically all the remainder in the Otago Province. Consequently wheat is essentially a South Island crop.

Seeding usually takes place in early winter, and only very occasionally is it planted in spring. The land is ploughed a few weeks before the sowing period, and as it has previously carried well managed pasture, is invariably free from weeds, fertile and easily packed down to a firm seedbed by tillage operations, assisted by the regular rainfall. As a result wheat is planted in land possessing all the requirements of good fallow as we understand it in South Australia.

The grain is drilled in at the rate of 90 to 100lbs. per acre, together with about 1cwt. of superphosphate.

The varieties used are all of the late maturing type with the grain tightly held in the ears so that losses, which would



[Photo from the College Prospectus.

Massey Agricultural College, Palmerston North, where investigations into hairiness of wool and other research work is being conducted

Wheat and Other Crops in New Zealand.

There is less wheat planted in New Zealand than previously, due to the importance of pastoral industries and the increased area devoted to pasture.

In 1891 there were 400,000 acres seeded with this crop, whilst for the past two seasons there have been 286,000 and 225,000 acres planted respectively.

otherwise be caused by the prevailing winds, may be avoided. The most important wheats are Solid Straw, Tuscan, and Hunters, but these are of no value in South Australia owing to their susceptibility to red rust attack, and failed when tested in the late ripening Millicent area a few years ago.

The average yield is about 30bush. per acre, but returns of 70 to 80bush. are not uncommon. These high averages are due to freedom from weeds, density of crop and good filling of the ears.

The cereal research is carried out at Lincoln and Christchurch and is financed by a levy on farmers, millers and bakers. Each farmer pays a levy of 1½d. for each 50bush. of wheat he sells; each miller pays 1½d. for each ton of flour he sells; and each baker pays 1½d. for each ton of flour he buys.

About £2,000 per annum is obtained from these levies and this sum is subsidised on a pound for pound basis by the Government.

The plant breeding station is at Lincoln, and the cereal laboratory, which is well fitted with apparatus for testing both wheat and flour, is at Christchurch.

A Wheat Crop cut for threshing on the Canterbury Plain Note the open nature of the stooks to allow for the drying out of the ears In some cases a stook is built with only 4 to 6 sheaves

As a rule the wheat is cut with the binder and put through a grain thresher, although it was reported that a few header harvesters were used. However, owing to the cool and tough threshing conditions which usually prevail, the latter machines are not popular. The grain is not of high baking quality, and over the last three years about 10,000 tons of flour have been imported for blending purposes. This is secured from Canada and Australia, about 60 per cent. being obtained from the former and 40 per cent. from the latter. However, following work done by the Research Institute relative to improvement in the quality of wheat, flour and bread, it has been suggested that there should be an embargo on the importation of flour in the future.

Varieties have been introduced from other countries, selections and crosses made, and it is claimed that new wheats liberated recently are much superior to the older types in the quality of grain produced, and at the same time have not lost anything in yielding ability.

The average annual wheat requirement of New Zealand is approximately 8,300,000 bushels of which about 7,000,000 are converted into flour and about 1,300,000 used for seed and feed.

Somewhat wide fluctuations in total yield occur from year to year, and in order to give a reasonably stable value to wheat, duties on the importation of wheat and flour into New Zealand have been imposed. The result is that the average price of wheat for the last three years has been 4s. 3½d. per bushel.

Oats.

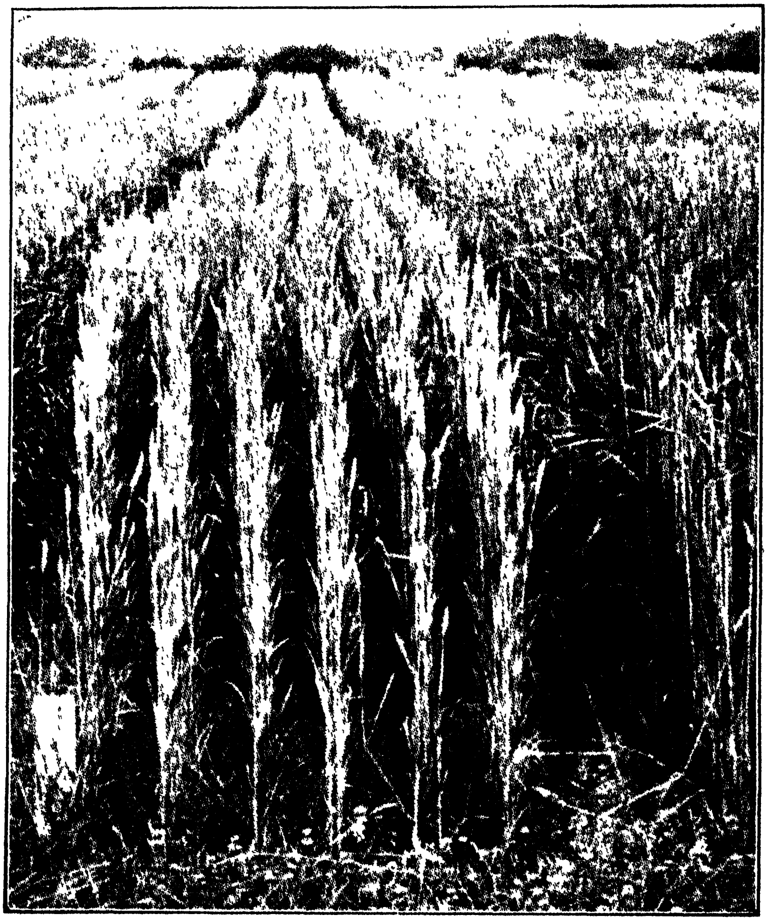
If the area planted for grain, hay and green-feed is taken into consideration, oats is the most important grain crop so far as the total acreage is concerned. The average yield is about 40bush., whilst the total yield approximates 3,000,000bush. per annum. This is harvested from about 75,000 acres.

Barley.

There is an import duty on malting barley, but not on grain of the Cape type. Consequently, the growing of barley of this class is usually unprofitable because of the possibility of importing feed barley from Australia. The usual planting is about 20,000 acres and the average yield about 36bush.

Pease.

Approximately 30,000 acres are devoted to pease averaging about 27bush. per acre. A good export trade has been built up, and about half the total production is shipped overseas each year.



[*From The New Zealand Farmer.*

Wheat Breeding Plots at Lincoln Agricultural College

Maize.

This crop is confined to the northern portion of the North Island. The growing of maize is encouraged by a duty on grain or cornflour imported into the Dominion.

However, despite this advantage New Zealand only grows about half her requirements for this crop. An average planting per annum is about 8,000 acres, from which a mean return of 48bush. per acre can be anticipated.

Potatoes.

Well-grown crops of potatoes are to be seen throughout the fertile areas of the Canterbury Plain.

Individual plots are not large, but the average aggregate is about 25,000 acres each year. The mean yield is about 5 tons, but at times very high returns up to as much as 20 tons per acre have been gathered.

As potatoes cannot be exported to Australia owing to an embargo against the New Zealand product, the only outlet for the surplus crop is a limited demand in Fiji and the Pacific Islands.

Chief Impressions.

After a tour including both Islands and the opportunity of inspecting numerous places of agricultural interest, a visitor cannot fail to be impressed with many features associated with the country. Chief amongst these is the suitability of the climate to pasture production and the efficient way in which the agriculturist is taking advantage of this fact.

The weather conditions favour the growth of plants. The cultivated area receives ample rainfall, and this is well distributed over the twelve months of the year. Severe extremes of temperature are not experienced, whilst the rainfall periods are spaced with spells of bright sunshine. These conditions allow for evergreen pastures, steady maturity of cereal crops, and consequent maximum yields of grain. The contrast with the weather normally experienced in South Australia is very striking, and emphasises the difficulties of the man on the land in this State. It follows therefore, that in many cases it is not possible to follow the actual methods adopted in that country, but the principles underlying all operations are the same, and from that point of view much information of value to the producer of pastures in South Australia can be gained by a visit to New Zealand.

The standardisation of agriculture is remarkable. Farmers working under similar conditions appear to have arrived at a decision regarding the most profitable system to adopt, and in one and the same district it is common to find farm after farm being dressed with the same class and quantity of fertiliser, planted with the same pasture mixture, being cropped on the same rotation, grazed on the same system and handling the same breed of livestock.

As a result there is a great uniformity of production, and the position is made much easier for the manufacturer and exporter. For example, the fact that practically all the export lambs are sired by Southdown rams and out of Crossbred ewes leads to great regularity in type of carcass produced and overseas purchasers can rely upon an even line of frozen lamb being shipped.

In the export of beef attention is being confined to the Aberdeen Angus breed of cattle, thus again leading to uniformity in the meat exported.

With regard to dairying the majority of cows are either Jerseys or grade Jerseys, whilst even with wheat almost the whole of the area devoted to this crop is planted with three or four varieties, comparatively with over 200 seeded each year in this State. From the experience of New Zealand there appears to be little doubt that with exceptions due to the stage of development of individual farms, much more standardisation of method and limitation of breeds of livestock is possible for districts in South Australia possessing similar soil and climatic conditions. At all meat works, butter factories, &c., one is impressed with the standard of quality fixed for export. No commodity possessing any defect is permitted to be shipped overseas, and so possibly damage the reputation of New Zealand produce. If still sound, but not sufficiently high grade to pass the test it is consumed locally, but is not exported. Very valuable work is being done by the New Zealand Department of Agriculture in the certification of pasture seed and the selection of pasture strains. The development of improved types of Perennial Rye Grass, White Clover, Cocksfoot, &c., and the recognition of the value of such seed by farmers is resulting in the establishment of superior pasture stands. Whilst some work has been already commenced in South Australia, particularly with strains of Wimmera Rye Grass, much more can be done with other useful varieties, together with the institution of a seed certification scheme.

To meet the difficulties following low prices for exportable products, the New Zealand farmer has concentrated on increased production per acre. Generally speaking he has been successful in his efforts and in this connection has been assisted by efficient officers of the Department of Agriculture. There appears to be close relationship between the farmer and the Agricultural Department, which includes veterinary officers, a fact of very great importance in dealing with problems associated with both animals and pastures.

Acknowledgment.

It is desired to place on record the sincerest appreciation of all members of the party to those who assisted to make this visit an unqualified success. To express thanks to the Advertiser Newspapers Ltd. for sponsoring the tour, to the New Zealand Tourist Bureau for efficient organisation; to Dr. Reakes, Director-General of Agriculture in the Dominion for permitting an officer of his Department to accompany the visitors, and to those officers who so readily supplied the information desired; to the local Committees who met us at various centres and made arrangements for individual members to visit places of special interest; to the different land owners, stock breeders, proprietors, and managers of factories and meat works, and officials of the public institutions for their courtesy, and the freedom with which they supplied the information sought.

The party travelled in an atmosphere of good fellowship, hospitality was lavished upon them, and it was this whole-hearted co-operation and friendliness which contributed toward the success and pleasure of the trip.

In the preparation of the foregoing notes, information contained in the New Zealand Year Book, articles published in the New Zealand *Journal of Agriculture* and "Agricultural Organisation in New Zealand" (edited by Belshaw, Williams and Stephens), have been freely availed of.

Summary.

1. The party which toured New Zealand comprised 16 primary producers from South Australia. They visited both Islands, commencing from the southern end of the South Island, proceeding to Christchurch; thence to Wellington and circling the North Island.

2. Practically one-third of New Zealand is cultivated land, one-third occupied but not improved, and one-third unfit for agricultural settlement.

3. The average farm holding is small, 45 per cent. being less than 100 acres in area.

4. New Zealand possesses a climate which is cool and moist. Over the greater part the annual rainfall lies between 25 and 60in. per annum with extremes of 13in. and over 200in. The rainfall is evenly distributed over the twelve months, whilst plants are not subject to extremes of temperature.

5. The soils of the cultivated area are naturally fertile, their chief deficiencies being phosphoric acid and lime. They consist of volcanic, alluvial, and a mixture of volcanic and alluvial types, together areas of rich loams and good sands.

6. Almost 32,000,000 acres are devoted to grassland farming, of which about 18,000,000 are sown pasture and 14,000,000 natural pasture. The natural pasture comprises *Poa*, *Festuca* and *Danthonia* grasses, together with other finer leaved fodders.

The striking feature of the sown pastures is the density of the herbage.

Where the stand is only intended as a temporary pasture 30lbs. of Italian Rye Grass and 6lbs. of Red Clover per acre constitute a typical seeding mixture.

A regular pasture mixture for a short rotation stand is 25lbs. Perennial Rye Grass, 10lbs. Italian Rye Grass, 4lbs. Red Clover and 2lbs. White Clover.

For permanent pasture the usual seeding is Perennial Rye Grass, 25lbs.; Cocksfoot, 10lbs.; White Clover, 3lbs.; and Red Clover, 3lbs.

The chief variation of the latter is the inclusion of 5 to 6lbs. of Paspalum and a reduction in the quantity of Cocksfoot when the seeding is to take place in districts enjoying mild winter weather.

7. Important work has been done at the Plant Research Station, Palmerston North, in the selection of improved strains of pastures, and farmers are freely using seed of these superior types.

[Photo., New Zealand Tourist Bureau.

An Apple Orchard near Hastings, Hawke's Bay. Apples are the most important horticultural product in New Zealand, and in 1934 fruit to the value of £723,264 was exported overseas.

8. Great care is taken in the preparation of the soil and the planting of pasture seeds.

9. Rotational or systematic grazing is fairly closely practised, and consequently farms are well subdivided.

10. After grazing, the roughage may be topped off with a mower and the droppings spread with harrows, but pasture cultivation is never so severe as to uproot permanent plants.

11. Each season large areas, mainly in the short rotation pasture districts, are planted with turnips, rape, swedes or mangolds as supplementary fodder crops.

12. Of recent years much has been done in the development of pumice land in the North Island, and it has been shown that this country is capable of producing good pasture.

13. New Zealand has built up a large business in the harvesting and sale of grass seed. The chief crops are Perennial Rye Grass, Chewing's Fescue, Red Clover, Cocksfoot, White Clover and Crested Dogstail. Considerable quantities are exported to the United Kingdom, Australia, America and Canada.

14. Superphosphate is the most important fertiliser, and approximately 2,000,000 acres of pasture land are top dressed annually. The quantities range from 1 to 2cwt. per acre, applied every second or third year, to 6 to 7cwt. per acre per annum, with a general average of 2½cwt.

15. Lime is used extensively, and applications vary from a ton or more every four or five years to 5 to 7cwt. per acre every other season. The mean dressing is 5½cwt. per acre.

16. Work done with nitrogenous fertiliser indicates that this manure has value in promoting the growth of out of season grass, but generally its use is not economic.

17. As a rule the soils are well supplied with potash, the exceptions being parts of the Taranaki and Southland Provinces.

18. Dairying is mainly practised in the North Island on specialised dairy farms, and about 5,000,000 acres are devoted to this industry.

19. The average dairy herd is 24 cows and the average dairy farm about 120 acres in area.

20. Ensilage is the more popular means of conserving fodder, and most dairy farms have stacks of this foodstuff.

21. The average butterfat yield per cow is 220.8lbs., whilst the main dairies reach 250 to 275lbs., and the best attain 375lbs. and over per cow.

22. On an acre basis the average production is 80lbs. of butterfat, but on specialised dairy farms the return lies between 125 and 150lbs. of butterfat per acre.

23. It is probable that at the present time the number of Jersey or grade Jersey cows approaches 80 per cent. of the total dairy cattle.

24. Herd testing is generally adopted by dairy farmers.

25. There are 210 butter factories and 274 cheese factories in New Zealand, and therefore very little of the milk or cream has to be transported over long distances.

26. An export trade with vealer calves has been built up, and in 1934, 954,000 calves were treated for shipment overseas.

27. Co-operation in the dairying industry is very strong, and practically all the factories, both butter and cheese, are co-operative concerns.

28. The New Zealand Dairy Produce Control Board has been effective in bringing about a substantial reduction in freight and insurance rates and conducting a successful advertising campaign in the United Kingdom.

29. The frozen beef industry is expanding and the Aberdeen Angus or Aberdeen Angus Crossbred cattle are most favoured.

30. The climate of New Zealand is well suited to the raising of sheep.

31. The Crossbred ewe which is the mother of the New Zealand export lamb is principally of Romney Marsh blood, although Lincolns, Leicesters and Merinos may be included amongst her ancestors.

32. It is by the mating of Crossbred ewes with Southdown Rams that well-shaped lambs filling the requirements of overseas markets are obtained.

33. The Romney Marsh, Corriedale and Southdown are the most important breeds, whilst in the high country of the South Island large numbers of Merinos are kept.

34. Approximately half the sheep are held in flocks of under 500.

35. There are three main classes of sheep farms, namely, the Merino farms, the hills farms and the fattening farms. The last-named obtain their ewe requirements from the hills farms, and also top up store lambs bred in those areas.

36. The average lambing is 90 per cent. with most of the fattening farms exceeding 100 per cent., and many reaching as high as 140 per cent.

37. Very great care is taken in the marketing of lambs, and as a rule each animal is handled before being forwarded to the meat works.

38. Lambs are usually marketed for export "under schedule" when the farmer is paid a definite value per pound according to the weight and quality grade.

39. The standard of inspection for export meat is high and no carcasses are sent away showing any defects or disease.

40. It is very striking to see the uniformity of the carcasses in the freezing chambers. This regularity is due to the fact that the great majority of the lambs are bred on identical lines and carefully marketed.

41. An export market in mutton has been established, and the cull ewes from the fat lamb breeding flocks are disposed of in this way.

42. The Meat Board has done much valuable work to the advantage of the industry.

43. The average fleece weighs only a little more than 8lbs. and is of the Crossbred type.

44. The problem of wool improvement and the elimination of hairiness has been investigated by the Department of Agricul-

ture, and the Benzol test which promises to be of considerable value was evolved at the Massey Agricultural College.

45. So far the Benzol test has been confined to Romney Marsh sheep, but there is no reason why it cannot be applied to other breeds.

46. A number of sheep diseases occur, but as early and careful precautionary treatment is given they are usually kept in check.

47. Romney Marsh breed is not immune to footroot, but is resistant to the disease. The common means of treatment are employed, but are commenced in late summer, with the result that infection is reduced and the disease is kept under control.

48. Owing to the high cost of supplementary foods, the pig industry has not developed to its fullest extent and most carcasses are exported as pork.

49. The Berkshire including the Canadian strain is the most popular breed, and when mated with the Tamworth provides the export animal.

50. The Dominion is not an important wheat producing country, and there is no export trade, but on the other hand, in recent years about 10,000 tons of flour have been imported annually for blending purposes.

51. The average grain yields are high, being approximately 30bush. per acre for wheat, 40bush. for oats, 36bush. for barley, 27bush. for pease and 48bush. for maize.

52. Potatoes thrive on the Canterbury Plain, and from a total area of 25,000 acres an average acre yield of about 5 tons is secured.

53. Amongst the outstanding impressions were the favourable nature of the soil and climate for pasture production; the efficiency of the average agriculturist and the great advantage of more or less standardised methods of farm and livestock management.

54. Appreciation is expressed for the efficient manner in which the tour was organised, and for the information so freely given by farmers and others with whom members of the party came in contact in New Zealand.

Colonial Skin Wool and Dead Wool.

"Will Colonial skin wool be regarded as dead wool at sales?" was a question asked at the Ceduna Conference. Mr. A. H. Codrington (Instructor in Woolclassing at the School of Mines) supplied the following reply:—

"Colonial skin wool is an English term applied to the product of Colonial fellmongering trade, and is wool that has been pulled from skins of slaughtered sheep after the pelt has been treated by the Sodium Sulphide process, whereas 'dead' is the description given to wool which has been plucked from sheep that have died.

"As 'Colonial skin' and 'dead wool' are widely different types, it is not usual for the former description to be regarded 'dead' wool at sales. However, it is probable that the question alludes to wool removed from rough parts trimmed off sheep-skins. These 'pie' pieces are soaked in water until the pelt decomposes to the stage when the wool can be easily pulled. Wool is then washed, but as it retains a strong odour similar to that of 'dead' wool, it would probably be typed as such."

Production of Butter and Cheese.

Production of butter and cheese for June, 1936, was:—Butter, 805,529lbs.; cheese, 537,204lbs.

Activities at Roseworthy Agricultural College, 1935-36

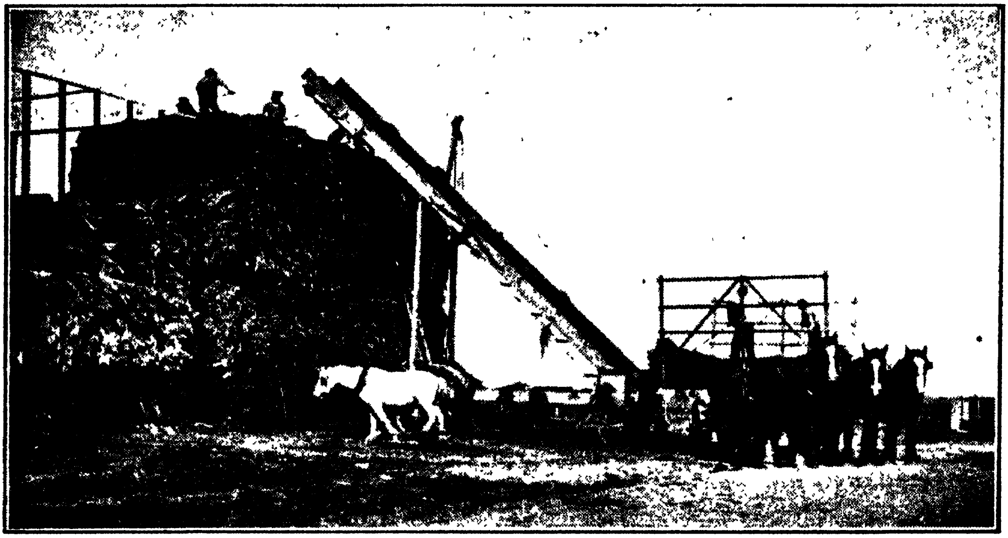
Part III.—Hay, Silage, and Grain Reserves. By A. R. Callaghan, D.Phil., B.Sc. (Oxon.), B.Sc.Agr. (Syd.), Principal, and O. Bowden, R.D.A., Farm Manager.

Generalisations.

The 1935 season was a season of plenty and, consistent with the policy repeatedly advocated by the College, full advantage of the abundant growth and good yields was taken, not only to replenish the depleted reserves of fodder, but also to build them up to as high a level as supplies and labour would permit. By way of emphasising the wisdom of taking full advantage of such a bounteous season, this portion of the report has been given separate entity.

In Part I. of the series attention has already been drawn to the general results obtained in relation to previous years, and as the figures and graph given therein indicate, the roughage gathered in the form of hay and silage in 1935 was well above the average. In fact, the total of 1,469 tons, made up of 720 tons of hay and 749 tons of green fodder ensiled, is the largest amount ever handled at the College in one season. Under the circumstances it is reasonable to ask how such was possible last year and not the year before. Indeed a glance at the corresponding figures for 1934 discloses an irregularity, for only 207 tons of hay and 356 tons of silage were made in that year, totalling 563 tons of roughage. This figure represents only a fraction of the 1,469 tons handled in 1935. The reason for this violent fluctuation is seasonal, and paradoxically enough it is the very reason why the fluctuation should exist. The season of 1934, although a good cereal year, was a poor fodder year, the opening was early, but was not followed by good rains, feed was scarce, and in reality it was a year in which inroads were made on reserves carried over from previous good seasons, rather than one in which reserves were built up. Now 1935 offered absolutely reverse conditions, the opening rains were early and were followed by supporting rains throughout the winter, with the result that feed was abundant, certain paddocks were definitely closed to make maximum growth for silage making, and hay crops were tall and thick. Obviously the opportunity existed to build up reserves of hay and silage, and it would have been sacrilege to have neglected to do so. The appalling truth is, however, that throughout the length and breadth of our State such sacrilege was allowed. One example will suffice to bear witness to this, for in the South-East last year pastures were magnificent at many centres, so profuse and abundant that sheep were literally embarrassed by it all, to the extent that their feet seldom touched solid earth, and footrot was rampant. No supreme effort was made to make sure that none of that bounteous growth was wasted. A few made some efforts, but the general effort must have been poor, for in less than 12 months' time nature had indulged in one of her neglectful moods and the cry was one of feed shortage. The pity of it is that this state of affairs recurs in every district of the State either one season or another. The solution to the problem is provided by nature's kindly thought of giving superabundance in certain years, and if livestock are to be properly cared for, if the regularity of animal produce is to be maintained, if pastures are to be managed correctly, if closer settlement is to mean anything, and if seasonal failures are to be avoided, the practice of conserving fodder must be universally adopted with a vigour and virility at present unknown.

The storage of food supplies for livestock must be systematically undertaken by every capable farmer, seasonal reserves are important, but reserves to meet periods of abnormal shortage are equally necessary. Besides storing roughage as hay and silage, the reservations of concentrates in the form of grain should be undertaken. The College has for some time endeavoured to give a lead to the general community, and it is in pursuance of this policy that details of certain phases of the work are given in this report. Already much has been written on silage making and it is not the intention to describe this aspect of the year's work in the same detail as was done two years ago A useful series of photographs was taken, however, and they are included and tell the story in more graphic form than the printed word is capable of.



The hay-elevator was used in building this pole-guided silage stack; 189 tons of sheaved fodder, with some loose burr medic, were ensiled in this framework. Note the previous season's stack adjoining

Bearing on the hay and grain reserves some fresh ground is covered and two special features are described, one, a portable mouse-proof fence to protect haystacks in the field, and the other, grain silos for the storage of grain in bulk. Numerous requests have come to hand for particulars of this kind, which at least indicates a steady recruitment to the ranks of those possessing fodder-conservation consciousness. Having prevented waste by conserving fodder, adequate precautions must be taken to prevent waste of fodder so conserved, and the greatest of all waste in this latter respect is evident in the manner in which hay is neglected, and in which grain is stored.

The Hay Harvest, 1935.

Good hay years are those in which early rains are followed by moisture and temperature conditions conducive to steady growth throughout the growing period. Such was the case in 1935 and all the College wheat and oat crops would have given very satisfactory returns for hay. In several cases, and this applied particularly to the oats, crops that were left for grain to meet pure seed requirements would really have been more profitable as hay.

The total of 720 tons harvested consisted of 135 tons of oaten, 537 tons of wheaten, 8 tons of mixed cereal, and 40 tons of meadow hay. Of these amounts, 631 tons were obtained from the main farm areas exclusive of experimental paddocks; this tonnage was taken from 311 acres, the average yield per acre being 2 tons 0cwt. 73lbs.

Hay Yields at Roseworthy Agricultural College, 1935.

(a) *Wheaten Hay.—Total* 540 *tons. Average yield per acre,* 2 *tons* 0*cwts.* 73*lbs.*

Variety.	Field.	Area in Acres.	Yield per Acre.		
			Tons.	cwts.	lbs.
Nawab	No. 6B and No. 6C	14	2	13	39
Dundee	No. 6A	17	2	10	82
Baringa and Early Gluyas	No. 5	8	2	9	108
Ford	Flett's B & C	68	2	7	64
Ranee	Nottle's C	39	2	6	98
King's White	Crouch's A	14	2	0	1
Sword (Hail damaged)	Day's A & B	75	1	13	105
(b) *Oaten Hay.—Total* 135 *tons. Average yield per acre,* 2 *tons* 0*cwts.* 33*lbs.*					
Mulga and Burke	No. 7A	13	2	0	90
New Zealand Cape	No. 5	21	2	0	49
Mixed Varieties	Old oval	2	2	0	12
New Zealand Cape	Crouch's C	11	2	0	0
Early Burt	Daly's C	16	1	19	41
(c) *Meadow Hay.—Total* 40 *tons. Average yield per acre,* 1 *ton* 9*cwts.* 6*lbs.*					
Volunteer Burr Medic and Oats	Day's C	28	1	9	6

The tabulated results above show that 40 tons of meadow hay were made. This was cut at the end of August from a portion of the paddock (Day's C) which had been fenced off and closed to livestock. The growth of burr medic and other volunteer growth, on this, and other areas that had been closed from the end of April onwards, was exceptionally good and the amount of fodder available baffled the resources of the farm so that it was impossible to handle it all as silage. Consequently the mower was put to work in the closed section of Day's C at the same time as work on silage gathering proceeded elsewhere. Subsequently the cut fodder was raked and cocked. Rain interfered with its proper curing, and the cocks had to be turned on two or three occasions. By taking the latter precaution very little damage accrued and it went into the stack in quite good condition. It has since been fed and was especially relished by the cattle.

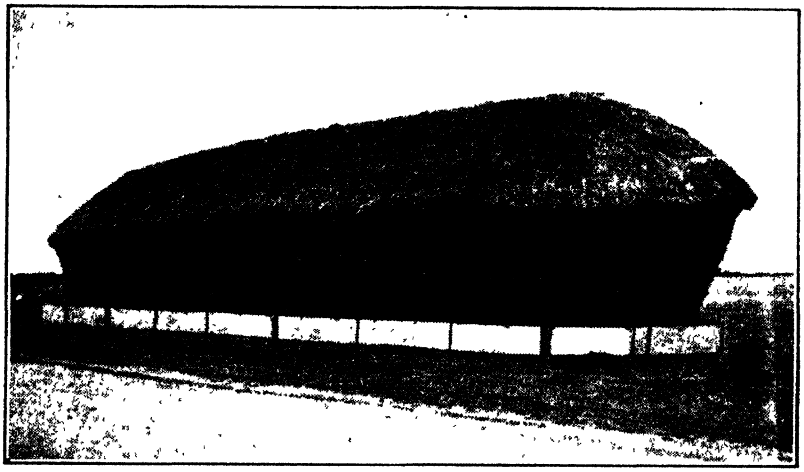
The cereal hay harvest began on the 14th October, and while as a whole fairly good quality hay was made, cases of tangled crops occasioned some inconvenience in cutting. The oat crops were the most troublesome in this respect and it was not until a lifting attachment was fitted to the binder comb that much headway was made.

From the table the high yields from Dundee and Ranee need some explanation, as these two wheats can hardly be classed as hay varieties. Large portions of both crops were dealt with as hay on account of heavy contamination with wild oats. Normally such areas are cleared most effectively as silage before the wild oats begin to fall, but last year it was impossible to handle any more silage in the time available. By cutting these areas out of the Dundee and Ranee at the early hay stage good use was made of the associated wild oats; at the same time large quantities of seeds were prevented from falling.

The extremely good hay returns from Nawab again call for notice. All the Nawab was harvested from experimental areas and the fields included different cultivation treatments, some of which were non-fallow, and results from different soil preparations on stubble as well as ley land. The variety was therefore at a definite disadvantage, which makes the results the more noteworthy. As a dual purpose wheat for localities similar to Roseworthy Nawab has few rivals.

Protection of Haystacks.

Hay is unquestionably the ideal roughage to conserve for use in normal maintenance and dry feed rations to meet the regular seasonal shortages. This is especially true as far as horse feeding is concerned. When it is a matter of holding the reserves for any period longer than the normal eight or nine months, the protection of the hay must then be given closer attention. Apart altogether from yearly deterioration of feeding value, hay, unless carefully protected, is subject to the depredations of mice and damage from the weather. The annual wastage of hay throughout the country is enormous; the chief enemy is carelessness. With reasonable care and attention the biggest part of this waste could be avoided.



The hay stack built in Flett's B and C, 1935, thatched and guarded with a mouse-proof fence.

Of the 720 tons harvested last year at the College it is obvious that a large proportion of this would be carried over for a longer period than 12 months, consequently adequate steps were taken to assure minimum storage loss. A total of 407 tons was stacked under cover of the hay shed at the farm. A small stack of 30 tons was made in Crouch's C, which was meant to serve the hay feeding requirements of young horses. A stack of 127 tons was made in Day's A and B, but it was offered no other protection than thatching, as it was the first on the programme for chaff cutting. The 40 tons of meadow hay were also stacked in the field ready for early use.

A large stack of 136 tons was made in Flett's B and C, and in this case special care was taken as the defined intention was to hold this stack over as a definite reserve. In the first place, the builder was instructed to place the outside sheaves throughout the stack with a downward and outward bias, particularly in the higher layers and the top. This helps to prevent rain, which beats on the side of the stack, from working inwards. Secondly, the stack was well thatched, and finally, a galvanized iron mouse-proof fence was built around it.

A Transferable Mouse-Proof Fence.

All three considerations help to prevent avoidable loss, and it is surprising that greater care and attention to detail is not given more generally, for, after all, the handling of the hay from the field to stack involves time and expense and the monetary value of the hay makes it worthy of closer protection. A good cover does not entail much labour and the straw required is available for the gathering, but protection against vermin means a certain amount of expense. After inspecting several efforts at mouse proofing in various localities, it was considered that more serviceable designs were possible. The chief consideration was to incorporate the idea of constructing an enclosure in such a way as to make it transferable from one site to another, without undue inconvenience or damage.

Many mouse-proof fences are constructed of corrugated galvanized iron, either placed horizontally, which, after allowing for 3in. in the ground, are too low, or placed vertically, which entails too many junctions up which mice have a fair chance of climbing. To avoid these difficulties and to get a flat, easily handled surface for handling at the time of transfer of the fence from one site to another, flat galvanized iron was preferred. This is procurable in sheets 6ft. by 3ft. Twenty-two gauge iron is satisfactory.

A close-up view of the hay-stack to illustrate more clearly the effectiveness of the flat galvanised iron mouse-proof fence This was constructed in panels or frameworks, as described in the text, making it readily transferable after the stack has been used.

By way of conforming with the size of the galvanized iron sheets, frameworks or panels of 3in. by 2in. oregon were made 11ft. 9in. by 2ft. 8in. outside measurements. This allowed for the joining of the sheets and the protrusion of 1in. at the end of each panel beyond the woodwork for overlapping and joining with the corresponding ledge of the next framework. Four inches were likewise allowed to protrude beyond the lower support of the frame, later to be let into the ground when the frames were placed in position.

These frameworks were then bolted on to 4in. by 3in. jarrah posts, the latter being the same height out of the ground as the framework, that is, 2ft. 8in., and placed 6ft. apart. As each framework was securely bolted to the jarrah posts the fringes of iron already referred to were screwed to the frame work adjoining. The joins so made were very satisfactory, but to make doubly sure, pieces of iron 4in. long by 4in. wide were nailed at the top and allowed to project over each join guarding it, as it were, at the top. The photograph taken close up to the stack shows the joints and these small pieces of iron attached to the framework over each one.

The fence was erected round the stack 2ft. away from the sides and ends, and was very quickly placed in position. This ease of erection, and dismantling, overcomes the disadvantages of having to stack the hay wherever the mouse-proof fence happens to be originally built. Further, after the stack has been used, it can be dismantled and stored without any damage and with little trouble until it is commissioned for further use.

The cost of the material for the fence round the stack in question, which is 100ft. by 20ft. and holds about 140 tons, was £17. Charging this to the one stack alone involves a mere 2s. 6d. per ton, a sum that might well be exceeded many times over by the value of hay damaged if unprotected from mice.

The mower, with curved iron rods attached to the knife-bar, cut the fodder and rolled it into neat wind-rows, which greatly facilitated subsequent handling

Silage Harvest.

From an area of 183 acres harvested for silage, a total of 748 tons was gathered at an average yield of 4 tons 1cwt. 54lbs. per acre. Of this tonnage, 387 tons were volunteer growth consisting chiefly of burr medic and self-sown wheat and oats, which gave an exceptionally high average yield of 5 tons 12cwts. per acre. The remaining 361 tons were of cereal material, chiefly oats. Individual yields and sources of material are as tabulated on the following page.

Silage Harvest at Roseworthy Agricultural College, 1935.

Material Used.	Source.	Area in Acres.	Yield per Acre.			Weight Harvested.
			Tons.	cwts.	lbs.	Tons.
New Zealand Cape Oats	Old supherphosphate plots (Grainger's)	2	6	11	15	13
Burr Medic (practically pure) .	New superphosphate plots (No. 5)	17	5	13	59	77
Burr Medic and other volunteer growth	Flett's A	55	5	12	81	310
Early Kherson Oats	Crouch's D	39	3	6	2	130
New Zealand Cape and Early Kherson Oats	Crouch's C	70	3	1	92	218

The fodder was ensiled as two round loose stacks in Flett's A containing 310 tons, a pole-guided stack at the farm of 189 tons, while 249 tons were placed in the overhead reinforced concrete silos at the farm.

Sweep-rakes were used to convey the fodder from the field to the site of the stack, where it was tipped as shown in the illustration.

From time to time details of the various methods used have been described, and to avoid monotonous repetition, interested readers, unacquainted with the procedure and the system of stacking loose and sheafed fodder for silage, are referred to the *South Australian Journal of Agriculture*, September, 1934, Further particulars concerning the pole-guided stacks will be found in the December, 1935, issue. The accompanying illustrations relate effectively the story of the silage gathering at College last season.

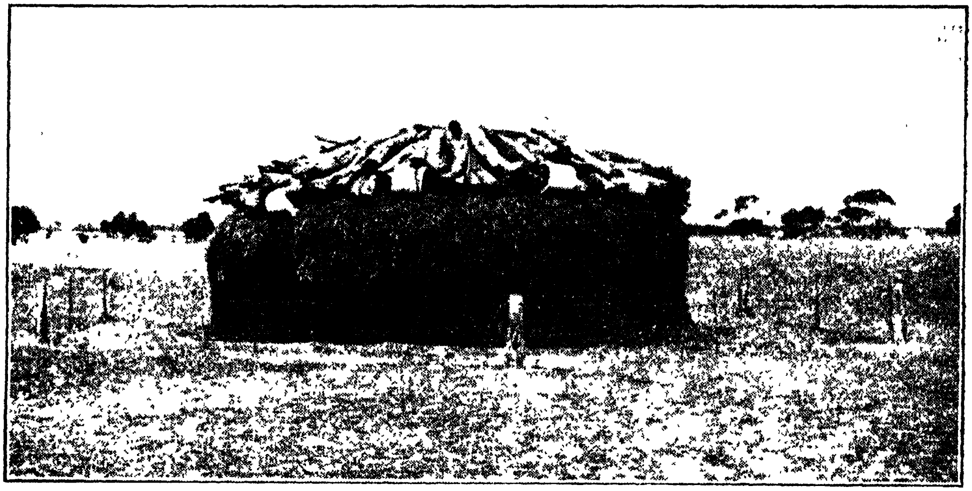
In the first part of this report published in the June, 1936, issue of the *Journal,* two photographs, depicting the wealth of self-sown growth on ley land in the form of burr medic and other volunteer material, were given. The illustrations herein were taken in the same paddock when the fodder was being cut and stacked in the field. The mower, together with the rod attachments (as described in the *Journal of Agriculture,* September, 1933) handled the material with neatness and precision, leaving it in light wind rows as shown in one of the accompanying illustrations. The fodder was then hauled to the site of the stack, situated in the middle of the paddock to save time (and time is the essence of the contract), where it was tipped and subsequently hoisted on to the stack with the grab-stacker as the illustrations show. Work began on the first loose stack on 21st August, 1935; by the end of the month the stack had reached the maximum lifting height of the grab (18ft.) for the third time. The stack was then closed and weighted down with timber and old cement troughs. Later it was fenced in as another of the photographs show.

After the material was tipped by the Sweep-Rakes it was hauled on to the stack by means of the Grab-Stacker Note the tarpaulin protecting one side of the stack from the prevailing wind.

After choosing a central site on a slight mound to facilitate drainage, the second stack was begun. With weather damp and cool for the first few days, about 70 tons were gathered and stacked in good condition. From this stage on, very drying winds with rising temperatures ensued and the other 80 tons added to this stack were in less succulent condition and considerably less juice drained away from the stack. This fact is mentioned, for at the time it was thought the upper layers of this stack would have been subjected to rather too high temperatures and rather inferior silage was expected. However, this stack has since opened out in wonderful order, a photograph of the open stack being published herewith.

Residual Superphosphate.

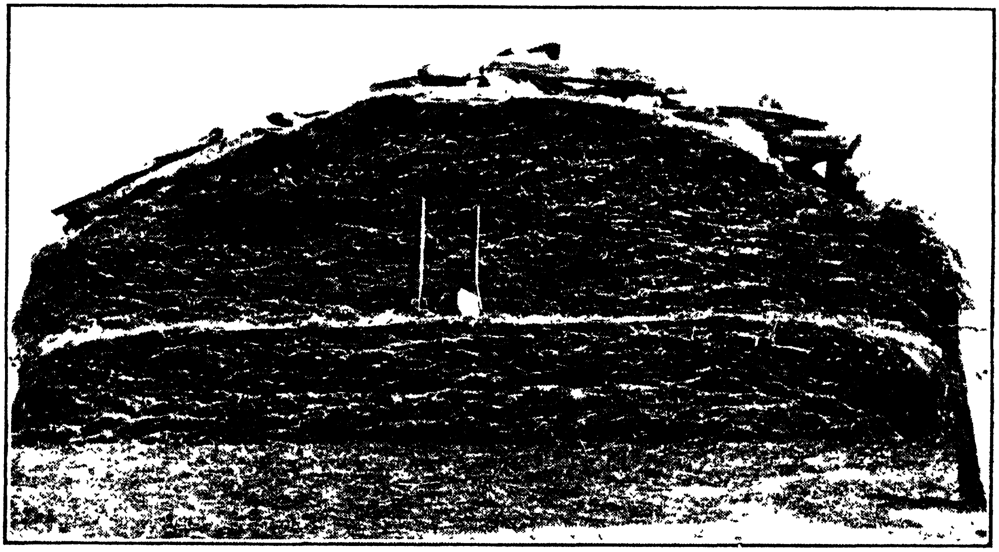
Special notice must again be drawn to the phenomenal results obtained from what can be attributed to the effects of residual superphosphate. The story of the paddock Flett's A is an excellent advertisement for the practice of liberal use of superphosphate on a property. The silage gathered from the 55 acres of this paddock was placed in the two stacks above described, in all 310 tons, so that a yield of over 5½ tons of self-sown green fodder was taken from the field.



The first stack built in Flett's A last season, weighted down and securely fenced. This stack contained 160 tons of green fodder.

The history of the paddock is not one of extravagance, for it is doubtful whether any produce could be produced at less cost than the 310 tons ensiled in the stacks. In 1934 the field was sown to Ford wheat, using 1½cwts. of superphosphate per acre; the stubble was extensively grazed during the summer and autumn months of 1935. Following good opening rains at the end of April, the paddock was closed to all stock. At first growth was slow and no particular show of feed was evident early in the season, but burr medic had germinated all over the field and experience has proved that, given an early start, burr medic will make up with a flourish as soon as the first warmth of spring approaches. Such was the case, for by the middle of August the paddock was knee deep in fodder. In fact a description of the growth in the field would sound fabulous, and rather than leave the written word open to incredulity, readers are referred to the photographs. Actually, therefore, this field produced 310 tons of green fodder with no other expense than was necessary to handle it and loss of four months' winter grazing when feed was abundant. Unquestionably, the burr medic was favoured by the good early rains, a high phosphate level from residual superphosphate added the previous year to the wheat crop, and by protection from livestock. Many farms, in Central and Lower North districts especially, would yield similar results, but burr medic, or any other legumes for that matter, must have phosphate in the soil, and what is more, ample opportunity should be given the leguminous growth to reach its zenith period of production.

The College has advocated heavy dressings of superphosphate on the previous crop when a paddock is to lie as ley land the following year. This is largely to save top dressing, which would necessitate a special operation in the autumn, and which, as likely as not, would never be carried out, and it is also done to make sure that phosphate does not act as a limiting factor to the growing crop. In other words, sufficient superphosphate is added to the crop to make sure that it will not be in need of phosphate whatever else happens, and experiments have shown that if fully payable returns from the crops are not obtained in some seasons from the additional superphosphate thus added, extra stubble and ley land grazing, resultant from the higher phosphate level, will more than compensate for it the following year. There is no doubt that land liberally supplied with phosphate gives early, rapid and payable response.



The second stack to be built in Flett's A was the first to be opened It was built in September, 1935, and opened in March, 1936. Stacks of this nature open out in excellent condition

The argument so often heard against this practice is that late opening rains in the following season may mean a late germination of all herbage, including the medics, with the result that winter sets in and the full benefit of the residual superphosphate is not obtained. Certainly late opening rains mean that spectacular results such as those described herein are unlikely, but when the good season does come, the spectacular results longed for are certainly not possible unless the phosphate is there to stimulate growth and early root development. Probably the best answer to the argument referred to is for the farmer to top dress his ley land with, say, 1cwt. superphosphate whenever early opening rains are received, but sane, economical and "less-likely-to-be-forgotten" method is to use heavier superphosphate dressings on all crops, and in this way maintain and build up the phosphate level. The sequence of events following such a practice is too important to miss, for phosphate induces the development of legumes, they in turn enrich the soil in nitrogen and humus, and when the whole process is summed up, there is no better way of maintaining, or even increasing, the fertility level of any farm than by the liberal use of superphosphate. This is especially true on the wheat land soils, and applies to all parts of the State, the soils throughout being stricken with phosphate deficiency.

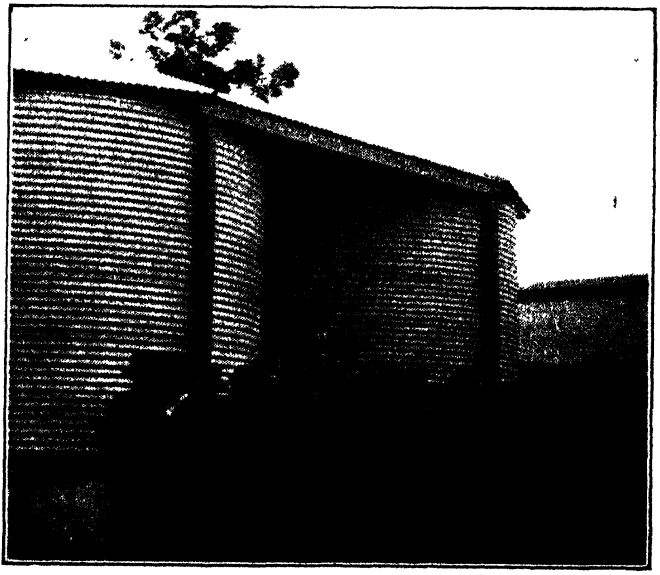
Another word concerning the closing from stock of such areas as the paddock described. As mentioned previously the zenith period of growth with the medics is in the early spring. Often enough, farmers must look at a paddock in June and think that it has a good coat of fresh feed, assuming at the same time that it is not likely to make up, consequently stock are turned in, preventing the growth that is about to begin from making much headway. Actually the paddock Flett's A was a disappointment in June last year, but with faith in those yet small, but vigorous, medics the paddock was kept closed. By July the medic was ankle deep, and by the middle of August knee deep in many places. The moral is to keep promising fields of this nature closed, for the full benefit of early root development is reflected in the spring growth.

For argument's sake, suppose that sheep had been turned in to Flett's A in June, would the equivalent of 310 tons of green fodder have been grazed from the paddock? It is hardly probable. Now on the assumption that those 310 tons of ensiled green fodder return 200 tons of actual silage, which they will do, and allow it to be fed at the rate of 4lbs. per sheep per day, which would be a good maintenance ration. This 200 tons of silage, taken from 55 acres, would feed 300 sheep at the rate of 4lbs. per sheep per day for the whole of one year, which is the equivalent of over five sheep per acre. Allow a liberal margin for enthusiastic estimates over practical realities and the results are still phenomenal and their significance can hardly be denied.

Grain Reserves.

The question of storing grain on the farm has become a matter of increased importance with the development of livestock interests. To store grain in bags is a hopeless and wasteful practice. Heaps of bags are subject to the ravages of rats and mice, causing serious loss both in cornsacks and grain. Further, the ingress of weevils is encouraged and their control difficult.

About two years ago the first efforts to store grain in bulk at the College were made by dividing one side of an old barn, which had mouse-proof walls and flooring, into four bins, each of about 600 bag capacity. The divisions and inside walls were of galvanized iron on a timber framework. This series of bins meant an enormous saving of bags, prevented waste of grain, made weevil control by fumigation very effective, and eliminated completely the menace of contaminated grain.



A group of visitors interested in the recently constructed grain silos Each container will hold 600 bags of grain

Based on this experience it was decided to make additional provision for the storage of feed grain, and two large galvanized iron containers, each of 600 bag capacity, were constructed as twin silos under the one roof. An elevator placed between them is used for filling. The dimensions of each tank are 15ft. 6in. in diameter and 11ft. 6in. in height, which provides a capacity of just over 1,800bush. For the sake of those interested a short description of these silos, their construction and cost is given. At some later date detailed specifications will be available for the benefit of inquirers.

To begin with, two foundational stands were constructed of concrete walls, the base for each tank consisting of a pentagonal wall 4½in. thick and 2ft. 3in. above ground level. Two walls 4½in. thick were built through the middle of the pentagon about 2ft. apart and on either side of these and parallel thereto a further supporting wall 3in. thick went through the pentagon. Bolts were set in the concrete walls so constructed to take a series of eight 6in. by 4in. jarrah bearers. Jarrah timber of the same dimensions was placed on the walls of the pentagon to take up the space and carry the weight between the main cross bearers. A jarrah floor of 8in. by 2in. timber, placed side by side on top of the bearers, completed this foundation.

The bottom of the tank was made of 20 gauge flat galvanized iron, the 6ft. by 3ft. sheets used being riveted and soldered together. The first circle of the tank, one galvanized corrugated iron sheet wide, was made of 20 gauge iron, using 7ft. and 8ft. sheets. For the other five tiers of 2ft. iron added to complete each tank, 22 gauge corrugated iron was used. The bottom tier was the only one riveted and soldered at the joints, the other rungs of iron being riveted only, but by using both 7ft. and 8ft. sheets additional rigidity to the tanks was provided by enabling the joins throughout to be staggered. Around the top of each completed tank a ring of 1¼in. by 1¼in. by 3/16in. angle iron was attached; this not only offered protection and strength to the top, but it was also used as a support for portion of the roof, some of the timber of which was bolted to it.

The roof was made of 24 gauge galvanized iron and was supported by four jarrah uprights of 4in. by 4in. dimensions, in addition to the outer margins of each tank. The accompanying photograph of the silos make this constructional feature clear. The gable of the roof was made to begin practically from above the centre of each tank, the ends sloping towards the outside to take the shape of the outer half of the angle iron rim. This roof gives a very neat and symmetrical finish to the twin silos, and the whole of the construction is a true reflection of the efficiency of the College Mechanic, Mr. Nourse.

Filling is carried out by means of an elevator which conveys the grain to the open top. Provision for emptying was made by the insertion of a shutter-controlled doorway in the bottom tier of each tank. This doorway was made from a 4ft. by 4ft. sheet of 3/32in. black iron, in which a sliding shutter was inserted and the whole was then bolted to the side and bottom of the tank over a hole already cut in the lowest circle of the corrugated iron. This year the silos have been used, one partly filled with peas, the other with barley, and from the experience so gathered it is evident that over two-thirds of the contents will feed through the doorway of each tank without assistance.

A careful analysis of costs show that the building and fitting occupied two men for four weeks at a labour cost of £30. Materials cost £92 10s., making a total cost of £122 10s. Of this amount it is estimated that the walls and stand to the containers cost £53, including labour, the two tanks £48 10s., including their making, and the roof and its construction, £21.

Thus, for £122 10s., excellent storage for 3,600bush. of grain is provided, which amounts to only 8d. per bushel for one year. Against this the structure should be regarded as permanent, involving a substantial annual saving in cornsacks and in grain. On this basis it is feasible that such silos would pay for themselves in three or four seasons.

The containers as built at College were set on concrete stands to facilitate emptying. These foundations, as well as the additional height, meant increased costs, and where the question of time and labour is not very important this extra expense could be avoided. As against this the construction of silos of this kind are more or less permanent improvements, and convenience for handling grain to and from the silos should be given due emphasis. Other than possible adjustments in the costs of the foundations, it is very doubtful whether any reduction in cost on the basis of materials used in the tank and roof would be wise.

Lucerne for the Mount Pleasant District.

Asked "What is the best time to sow lucerne in the Mount Pleasant District," Mr. W. J. Spafford (Director of Agriculture) has advised the secretary of the local Branch of the Agricultural Bureau that lucerne cannot be looked upon as the most suitable leguminous forage crop to grow in the Mount Pleasant district, and really good results, persisting for several years, cannot be expected unless the crop is to be irrigated. The average soils of the district do not possess sufficient lime, nor are they of loose enough texture for lucerne to do its best, and although the crop may do fairly well for a while in most locations, it will thin out fairly quickly.

In most seasons October will prove the best month in which to sow the crop, but in some seasons, when the spring is early, September should prove a suitable time for seeding.

If the land is free from weeds and well prepared, about 8lbs. of seed per acre should prove sufficient if to be grown with the natural rainfall, but if to be irrigated, about 15lbs. per acre should be applied.

Better results are likely to follow drilling in the seed to a shallow depth after mixing it with superphosphate, being certain to mix the seed and manure immediately before drilling it into the land.

Analyses of Copper Compounds for Dry-pickling of Cereals.

During the months of May and June a number of samples were collected by the Department of Agriculture and sent to the Chemistry Department for analyses. The results of these analyses are given below, and by comparing them with the standards as set by legislation, it will be seen to what extent they meet requirements or fall short of them.

Standards as Prescribed by Regulations of the Pest Destroyers Act.	Total Copper (Cu.). Not less than 50%	Water Soluble Copper. Not more than 0·25%	Retention on a Standard I.M.M. 200 Mesh Sieve. Not more than 2·5%	Moisture.
Brands.	%	%	%	%
"Cresco"	51	0·10	1·77	3·4
Bickford's "Aero"	50	0·04	1·04	3·15
"Sporetox"	50	0·03	0·30	4·6
Blair's	50·7	0·05	0·20	1·5
Dollman's Dry Pickle	53·4	0·05	0·27	1·3
"Bunticide"	55·5	0·04	12·00	1·7
"Vallo Anti-bunt"	51·6	0·05	2·55	4·4
"Atamol"	50·2	0·05	6·11	2·4
"Kleencrop"	52·1	0·04	1·99	1·8
"Smutol"	52·9	0·04	5·94	2·1
"Sickle"	52·3	0·04	0·32	2·5

Wind Erosion of Soils in the Agricultural Areas

[By R. L. Griffiths, D.D.A., District Agricultural Instructor.]

Much has been heard recently in South Australia of the damage caused by wind erosion in the northern pastoral areas. The combined effects of low rainfall, overstocking and the ravages of rabbits are such that large tracts of country are rapidly becoming quite useless, and there is imminent danger of real desert conditions. Commonwealth and State Governments are alarmed, and officers of the Council for Scientific and Industrial Research have begun extensive investigation work, in the hope of finding a remedy.

The position is serious and, unfortunately, is not solely confined to pastoral areas. Many of the agricultural lands of the State, particularly those more recently developed, which are chiefly in areas of rainfall comparatively low—from 10in. to 17in. per annum—and include large areas of sandy soil, are rapidly approaching the same condition, where not only do soils become infertile, but farm buildings, roads, and railways are damaged or destroyed.

Some people believe that the ultimate end of human existence on the earth will be caused by exhaustion of soil from wind and water erosion. Whether this is likely or not, it must be realised that surface soils take long periods to evolve. It has been variously estimated that, in the evolution of the soil 1in depth of surface takes from 250 to 1,000 years to develop. During this period, of course, the soil is acted on by climatic agencies, by plants, and by microbes. Plant residues decompose and form humus, which has been described as "the life of the soil," and so the necessary fertility is built up. Every loss of surface means a reduction of the available nutrients, until the time arrives when those remaining are inadequate for crop or pasture requirements. There is no doubt that when our soils are gone, we too must go.

Experience of Other Countries with Erosion.

Erosion is not a new condition, nor confined to any one country, but the prevention of soil erosion, by either wind or water, is now recognised as being one of the most important problems with which farmers and pastoralists in many parts of the world are faced. Almost all nations are fighting it or, to some extent, have been beaten by it.

China is well known as showing some of the worst instances of soil erosion. Immense areas of country in the headlands of the Yellow River are now so denuded that they are incapable of supporting any population, and they were once rich fertile flats.

A recent report in the Adelaide press states that Soviet Russia is attempting to reclaim some of the Central Asian desert, of which it controls 1,100,000 square miles, sandy drifted country, on which at present only a few stunted bushes grow. The authorities are experimenting with the application of vegetable residues, chiefly cotton and flax refuse, treated with an alkali solution to form gluing compounds which hold the soil together, also with bitumen emulsions which are stated to serve the same purpose.

European countries, including Germany, France, Holland, and Denmark, have all been compelled to give up cultivation practices on certain areas to encourage growth of tough grasses on these sandy lands, and eventually to use them only for the growth of forest trees.

It is well known that in Northern Africa and Western Asia there are desert areas which were once the homes of well developed civilisations.

A recent publication from Kenya Colony states that in East Africa the native habit was to move to virgin land when the soil in any part became exhausted through erosion, but this is no longer possible because of increased population, and so, in parts of East Africa, desert conditions are in sight.

Also, in the Union of South Africa a Commission appointed to investigate supposed changes in climate and soil conditions stated that the alterations were entirely due to soil erosion, and if present conditions persisted the logical conclusion was the "Great South African Desert."

The nation about which most has been heard in Australia during recent years concerning soil erosion damage is the United States of America. A bulletin published in March of this year by the United States of America Department of Agriculture, called "Saving the Soil," states that wind erosion, resulting largely from cultivation, overgrazing, and depletion of the humus supply has affected about one-sixth of the total land area, principally in the semi-arid regions of the Great Plains, also that in terms of money the direct toll of erosion is estimated at 400,000,000 dollars annually. President Roosevelt has said, "The history of every nation is eventually written in the way in which it cares for its soil."

Sandy soil which needs binding by pasture plants

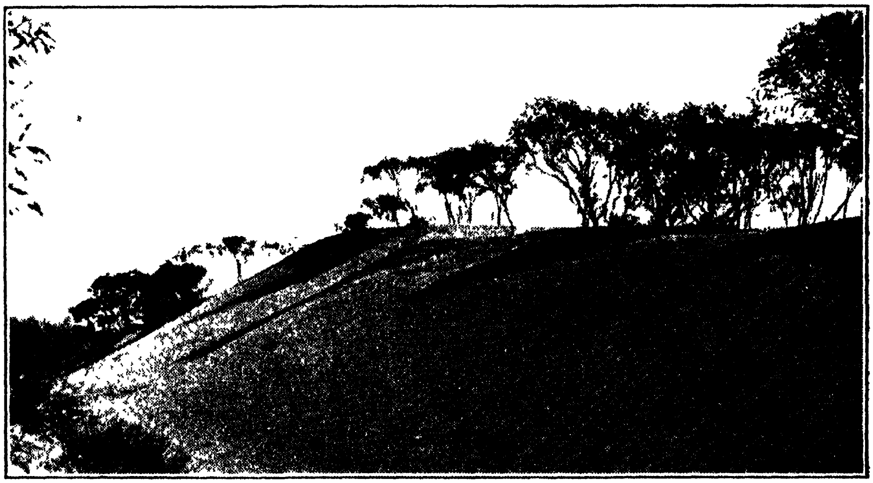
In the United States a special branch of the Agricultural Department, called the Soil Conservation Service, has been formed to investigate these problems and to publish monthly a journal dealing entirely with such matters. A Civilian Conservation Corps is also in action with the slogan "Save the surface and you save all."

Thus the problem is world wide, and South Australian farmers threatened by such conditions will be very wise if they attempt reclamation methods before the damage becomes too great.

The Causes of Erosion.

The removal of soil cover by wind or water is taking place to some extent everywhere, but under favourable conditions Nature starts at once rebuilding the soil from rock decomposition or by the addition of humus from decaying vegetable matter. Natural agencies only very rarely produce abnormal erosion, but the activity of man, by reducing vegetative cover or altering soil conditions, upsets the balance of Nature, and so in districts of high rainfall the surface begins to wash away, and in those of low rainfall to blow away.

Soils particularly susceptible to wind erosion are those composed of particles of equal size which do not easily form complex soil crumbs, and of these sandy soils are the worst. In these particular soils practically the only binding agent is the decayed vegetable matter—humus—and although most virgin soils contain an adequate supply of humus, much of the South Australian sandy land in low rainfall areas is originally deficient and quickly becomes more so with current agricultural practices.



Road buried by drifting sand

Most of the land in South Australia threatened by severe wind erosion is mallee land with a low rainfall, and a large proportion of it is sandy in nature. During the last 20 to 25 years, during which period many of these areas have been developed, the economic conditions have often been such that the farmer has been a victim of circumstances and unable, because of such circumstances, to carry out the principles of correct land use.

The usual method of developing scrub lands, by rolling and burning off the scrub, followed by the growing of several cereal crops in succession for grain, with stubble burns to destroy mallee shoots, while effective in the destruction of the original growth, leads to very rapid reduction in the soil humus. Wind erosion usually does not show to any great extent for some time, due to surface irregularities caused by stumps, to the presence of scrub residues on the top and coarse organic matter in the surface soil.

The deterioration of these lands has been more rapid that it would have been under normal circumstances. During and after the war, from the year 1915 until about 1926, there was a sequence of seasons, mostly with rainfall above normal and with prices for wheat much above the average. As mallee farmers usually started with insufficient capital, they naturally took advantage of these conditions to increase their capital, but in so doing seriously depleted the soils by overcropping with cereals. Then followed a period of low yields and depressed prices for wheat, capital reserves were quickly exhausted, and in the attempt to remain solvent farmers further taxed the soil by sowing still larger areas to cereal crops, chiefly wheat, so that farming practices in these areas have really been an exploitation of agricultural wealth with relatively little attempt to conserve capital in the form of soil.

This also has evidently been the recent experience of the United States, as the United States of America Department of Agriculture bulletin, "Saving the Soil," states that purchasing power of farmers has continuously been below the level of purchasing power of other classes for the past 15 years. This disparity has placed an economic burden on farmers which has had a direct relation to destruction of soil resources. The effective control of erosion depends upon the maintenance of farm income at a level which will permit individual farmers to carry out the principles of correct land use.

Present conditions in South Australia concerning wind erosion in farming areas are directly due to:—

(1) The removal of the natural cover, which allows the wind to sweep unrestricted over large areas of the soil surface.

(2) Methods which include the use of fire, both in the destruction of virgin growth and the burning of cereal crop residues, thus both destroying humus already in the soil and providing no material for its restoration.

(3) Overcropping the land with cereal crops, including the bare fallow period, which assists the wind to remove surface soil, and also further depletes the soil humus content.

(4) Overstocking the land, which leaves the surface bare, again assisting the wind, and which also directly starts drifts from the trampling of livestock. Under this heading must also be included the presence of rabbits, which is often the chief factor in the overstocking of land, and which by their burrowing habits start blow-out drifts, very difficult to check.

Means of Control.

It has been shown that a bare land surface and depletion of humus content are the chief causes of wind erosion, so that all methods of control must aim at restoring cover to the soil and the increasing of humus. This replacement of humus is particularly difficult in sandy land. Organic matter is decomposed in the soil by the action of bacteria which work effectively only in the presence of air. Sandy soils contain so much air that the process is very rapid and the organic matter tends to disappear without making much difference to the soil composition. Thus more material must be supplied for decay than would be necessary in other classes of soil. In order to do this farm methods must change considerably. Also to be effective it will be necessary for all farmers to adopt methods which will combat sand drift, and not only a portion of them, as otherwise good farmers will be troubled by erosion from adjoining properties.

It has been definitely proved that close cereal growing rotations are not successful on farms of sandy land and low rainfall, and the only alternative is livestock farming which, instead of taking from the farm all produce, will return to it organic matter from the farm animals and thus gradually improve soil fertility and condition.

Methods necessary for the control of sand drift must be:—

(1) Wide rotation systems, which will include a minimum of cereal growing for sale as grain and a maximum growth of cereals or pasture for the keeping of livestock.

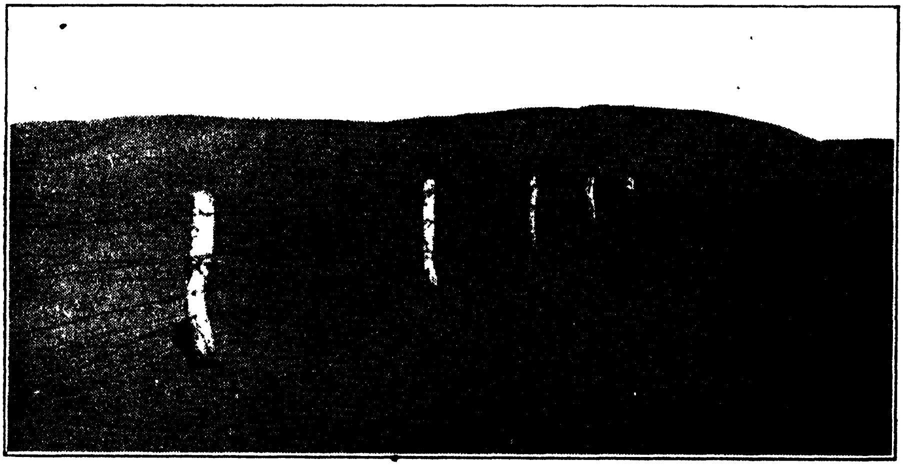
(2) The building up of carrying capacity on pasture lands, including leguminous plants where possible, so that the surface is better covered at all times and a greater amount of organic matter is returned to the soil.

(3) Controlled grazing to prevent overstocking and the subsequent trampling of livestock starting erosion. This will include subdivision and provision of more watering places for stock.

(4) Modified cultivation practices, chiefly with the object of preventing the wind from causing damage to a bare land surface.

(5) Special treatment of wandering sand dunes, which are liable to cause damage to adjoining country. This will consist of fencing, growing of sand binding plants, and eventually of trees.

(6) The provision of wind breaks by growing belts of timber along subdivision fences.



Damage to fences caused by sand drift.

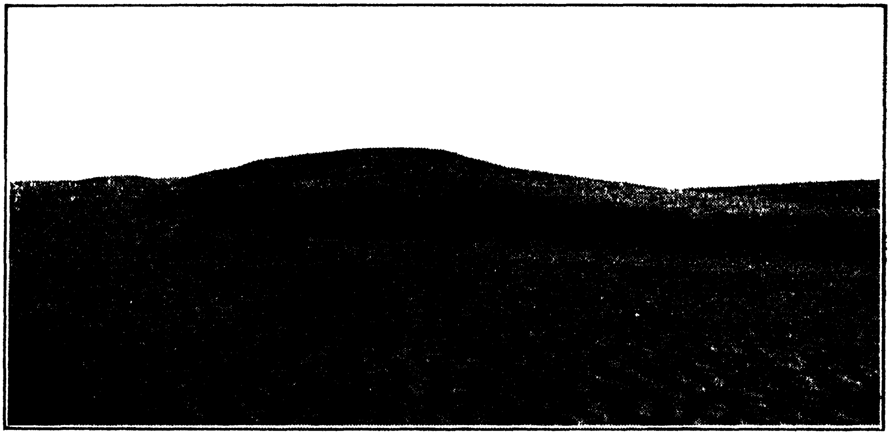
Importance of Rotation Cropping to Check Soil Erosion.

It has been previously stated that a bare land surface assists soil erosion. Work done at a Missouri Experimental Station proved that bare land surface eroded 137 times faster than the same land covered with grass. In the close cereal-growing rotations commonly used at present the bare fallow periods which follow one another comparatively closely give a farmer no chance to stop the drift; also with such rotations very little humus is restored to the soil. The change over to livestock farming will mean that although cereal crops are still grown to provide grazing and also fodder reserves for the livestock, fallow will be reduced to a minimum, and practically all crops and pastures will be utilised by livestock on the farm. More use will be made of the cereals other than wheat and the period between wheat crops sold as grain will be greater.

This may not mean eventually that the grain output of the farm will be very materially reduced, because, when the land improves in fertility and condition, the acre yield can be expected to increase. In the lowest rainfall parts wheat growing will probably become of only minor importance, cereal crops grown here being chiefly barley and rye—the cereals which throughout the world grow best in areas of sandy soil and low rainfall.

In all cases, in addition to the growing of cereals for the livestock, there will be extended pasture periods, attention being given to pastures so that they reach a higher carrying capacity than at present, and these pastures, always in conjunction with conserved grain, hay, and silage from cereal crops to carry over the lean period of the year, will provide the maximum vegetative cover so necessary to improve the soil structure, increase its moisture-holding capacity by increasing the organic content, break the effect of the wind, and help to bind the soil.

The development of such rotation methods—sound farming practices which make frequent use of pastures and grazing crops and less frequent use of grain crops—will provide a good supply of vegetable matter in various stages of decomposition towards the ultimate humus, which coats the soil particles and gives them cohesion and is the most important improvement that can be made in sandy soils.



Accumulated banks of surface soil caused by wind erosion

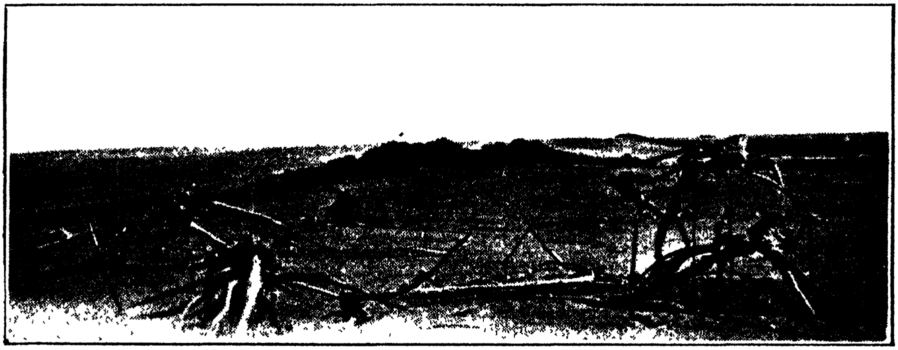
In such a rotation Lucerne must take its place. So much has been written by officers of the South Australian Department of Agriculture concerning the value of this plant that it is not intended to deal with it here at any length. It is the only perennial leguminous plant that has proved successful in areas of sandy land and low rainfall. It will hold the land together and provide some nutritious grazing almost throughout the whole year when the rainfall is seasonable.

There is no better plant to establish on pastures in these areas than Lucerne, but it must be remembered that it cannot be established on small areas or a portion of a paddock, as it is then quickly destroyed by sheep or rabbits. Large areas and whole paddocks have a much better chance of survival over a period of years, even in the 10in. rainfall country.

Rye also will be used to a very considerable extent. This cereal will probably be the most useful of all sand-binding plants. It is extremely hardy, grows very vigorously, particularly in the winter when most of the other cereals are of slow growth, and has proved its capacity to grow on soils so badly eroded that other cereal crops are almost a complete failure.

In other cases the fallow may be worked with cultivators, providing such cultivators leave the land well ridged in a direction as nearly as possible at right angles to the direction of the prevailing winds.

Unfortunately much of the land moves so easily that further precautions are necessary. On such land stubble should never be burnt, but should be broken up by sheep, and it should be so arranged that prior to fallowing there is a considerable residue of stubble or grass left on the land. Then the fallowing should be done with the cultivator instead of the plough, so that the vegetable residues still remain on top, and the land should be subsequently handled in such a way that as much as possible of this semi-decayed straw stays on the surface until the autumn months. It is really surprising how little vegetable residue on the land surface will protect it from the wind. Many cases have been seen where adjoining paddocks have been fallowed—one in the ordinary manner being badly eroded and the other with straw or grass residues remaining quite undamaged.



The effect of wind erosion

Some farmers prefer a modified practice of ploughing at usual fallowing time, then immediately sowing a small quantity of one of the cereals, usually oats or rye, utilising this as sheep grazing, and depending on the root systems of the plants, to hold the soil, which they effectively do. It must be pointed out, however, that this cereal crop utilises moisture and plant food which is needed for the succeeding wheat crop.

From a purely agricultural point of view, of course, as a preparation for a crop of wheat, all of these methods are wrong, but they are recommended and are moderately successful where conventional cultivation systems are impossible because of wind erosion.

When any fallow or modified system is attempted on these soils the initial working should be as early in the winter months as possible so that the underlayers may be well moistened and compacted by the winter rains, making them less susceptible to the influence of wind.

In extreme cases no attempt should be made at fallowing of any kind, but cereal crops should be grown on land prepared just before seeding—after the paddock has been brought into good condition by an extended pasture period. It is likely in the future that various types of implements, such as cultipackers, which compact the subsurface soil, will be of considerable benefit.

The Control of Wandering Sand Dunes.

Throughtout the eroded areas there are large hills or dunes of sand which have been gathered by wind action and which are a menace to adjoining country. No ordinary method will control these; special treatment is necessary. There are certain sand-binding plants which, when started, prevent any further movement, and the best of these are:—Rye, Blue Lupin (*Lupinus hirsutus*), Evening Primrose (*Oenothera odorata*), Pyp Grass (*Ehrharta villosa*), Marram Grass (*Ammophila arundinacea*), and in high rainfall areas Buffalo Grass (*Stenotaphrum americanum*) and Kikuyu Grass (*Pennisetum clandestinum*).

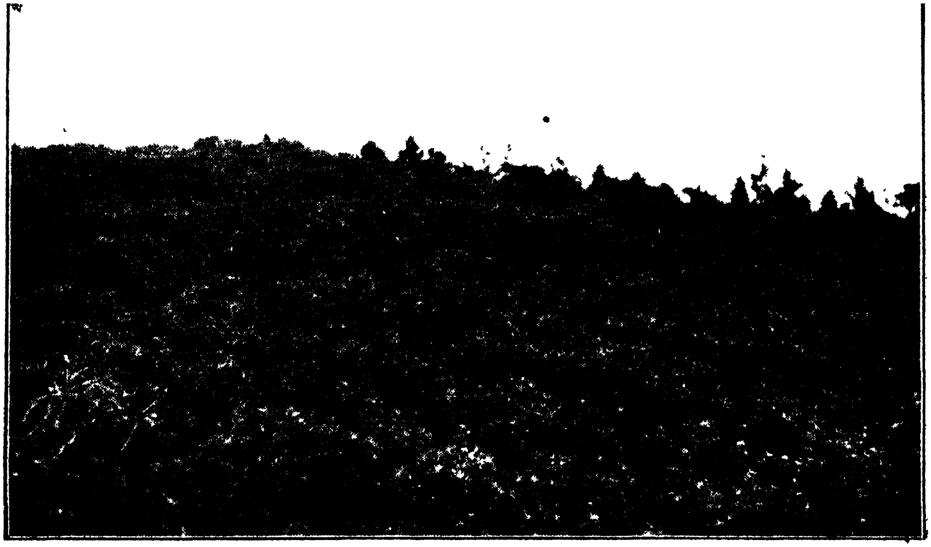
As a preliminary treatment a seeding of rye is always useful. If it is sown over the sand dune after autumn rain, at the rate of 1bush. per acre with superphosphate, it will usually germinate and grow vigorously, holding the sand until more permanent plants can be established. These other plants may be sown with the rye, or the next season while the rye straw is still holding the sand.

In very extreme causes, where even rye will not establish itself because of surface sand movement, it is necessary to cover the area with straw or brushwood until the sand-binding plants can grow.

Blue Lupin.

Blue Lupin is used as a sand binder or green manuring crop in many parts of the world. As it is a leguminous plant it has a greater value for soil renovation than many others. It has established itself well in districts with an annual rainfall as low as 14in. and may grow in still lower rainfalls

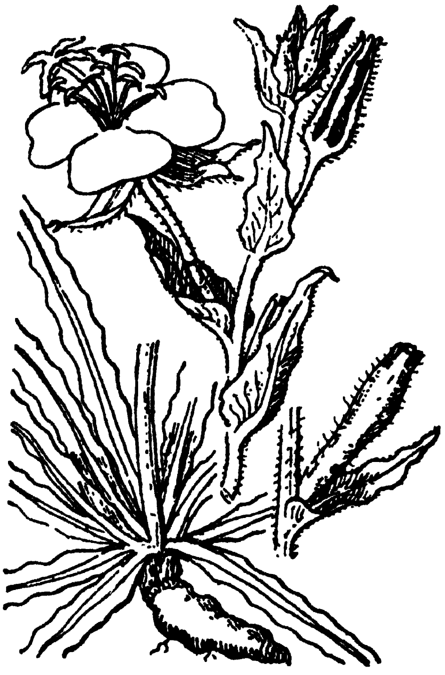
Although an annual it develops large quantities of seed, and when once established grows each year. The plant has no forage value, being disliked by stock, but the seeds are readily eaten by sheep, although it is not wise to give stock access to the sand dunes until they are thoroughly held by sand-binding plants. For this reason such dunes should be at least temporarily fenced off. A full seeding of Lupin is about 60lbs. per acre, but it will establish itself with a much lower seeding.



Roadside drift controlled by dense growth of Blue Lupin.

Evening Primrose.

Evening Primrose likes sand, will not grow freely on any other class of soil, and also develops well in areas with a rainfall as low as 14in. per annum. About 6lbs. of seed will sow an acre. The plant is biennial or perennial and provides good feed for stock when fully established, growing throughout the year so long as soil moisture conditions will allow it.



Evening Primrose (*Oenothera odorata*)

Pyp Grass.

Pyp Grass is a South African grass which is extensively used in that country for sand binding. Seed does not germinate well, so it is usually propagated by rooted cuttings planted 8ft. to 10ft. apart each way. The grass is very vigorous, sending out runners many feet in length and developing new plants from each node of these runners. It spreads freely over sand, but invariably stops when heavier land is reached. It develops an immense mass of coarse growth which cannot be described as a good fodder, but which is eaten by livestock. When the sand is fully held by the roots of the grass, surface growth can be burnt off and the fresh growth is much relished by farm animals. Pyp Grass is growing vigorously in 14in. rainfall country in the Murray mallee and would probably do moderately well in much lower rainfall areas.

Free growth of Pyp Grass (*Ehrharta villosa*) on loose sand at "Glen Lossie," Murray Bridge

Marram Grass.

Marram Grass, or Beach Grass as it is called in America, is commonly used to reclaim sand dunes thrown up by the action of the sea. It is probably the best of all sand binders, developing while sand movement continues and covering any drift. In fact, some writers state that once the sand movement entirely stops the Marram Grass begins to die out. It is not likely to do so well in areas remote from the sea, nor in those of low rainfall.

Buffalo Grass and Kikuyu Grass.

Buffalo Grass and Kikuyu Grass are both good sand binders in higher rainfall areas, but will not be successful in any district with much less than 20in. of average annual rainfall.

Movement of large sand dune stopped by growth of Blue Lupin and Bamboo

In some cases sand dunes can be permanently reclaimed by the use of these sand-binding plants; in others they eventually begin to move again and something more permanent is necessary. For this purpose the Bamboo or Giant Reed is very useful. It can be established by obtaining rooted canes, planting the whole cane horizontally in the ground, when new plants will grow from each node. This plant not only permanently holds the sand, but will also provide fodder for stock when needed, as the young growths up to about 6ft. high are quite good feed.

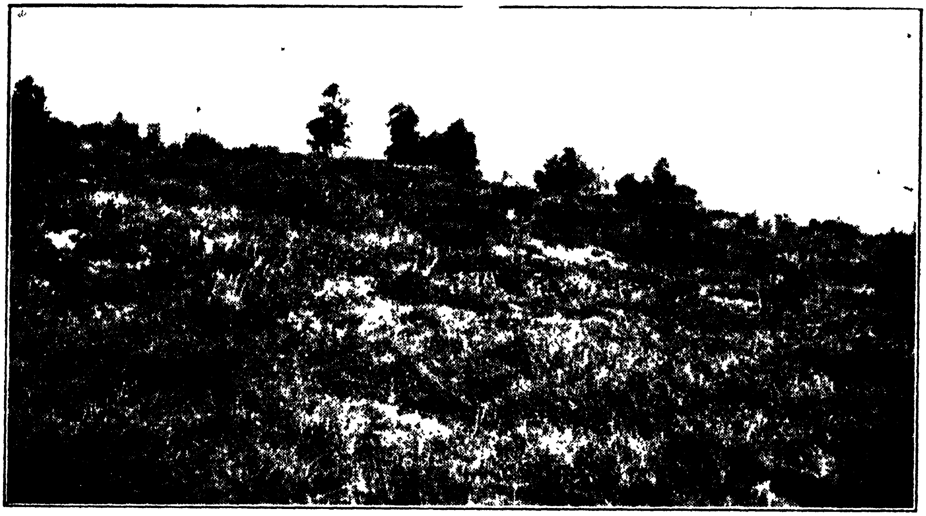
On these dunes, also, once they are held by sand-binding plants, trees may be established. In South Africa the Australian Tuart Gum is frequently used for this purpose, and there are many others which could be successfully grown here.

When reclaiming a sand dune, it is wise to commence with sand-binding plants at the origin of the dune, working over the surface until the moving front is reached.

Growing Trees for Wind Breaks.

Although the effective width of wind breaks of timber is relatively small, they help definitely in the protection of the surface soil. In addition, the growing of trees adds much to the appearance of the farm and also greatly assists livestock by providing shelter from wind, rain, and sun. Trees should be planted in clumps on the worst sand dunes and in belts along the subdivision fences where they will interfere least with ordinary farm practices.

Many farmers will not grow trees because they claim that the soil is robbed of moisture for too great a distance. This may be prevented, however, by periodically using a subsoil plough to as great a depth possible at a reasonable distance from the timber belt, thus cutting all lateral roots which are sufficiently near the surface to be harmful to pastures or crops.



After dunes are controlled by sand-binding plants it is wise to plant trees

Other farmers plant trees, but fail to care for them while young and so the trees, mostly, die. Protection from stock while the trees are young and a little watering when necessary for the first year after transplanting are amply repaid by subsequent growth.

Many trees do not transplant well if their root system is at all disturbed. It is wise to plant seeds in pots which can be transplanted with the tree to avoid this root disturbance. Pots of paper, cardboard, or even tin, can be used in this way. Seeds of certain tree species, chiefly the wattle, do not germinate easily, and need soaking in boiling water before planting.

There is a wide selection of trees for the farmer to choose from. Many of the native species will grow quite well. Among these is the Native or Murray Pine, which makes a good shelter and wind break.

Some of the scrub wattles are attractive plants, of which perhaps the best and most vigorous is the Umbrella Bush (*Acacia ligulata*), a very shapely shrub, usually 6ft. to 9ft. in height, which grows freely in many of the low rainfall parts of the State. The Broadleaf or Golden Wattle (*Acacia pycnantha*) also can be found throughout the mallee areas. When in competition with the scrub it is only a small tree, but when given a chance it will grow to a considerable size.

Rye provides first-class grazing, makes excellent silage, also good hay, provided it is cut soon after the flowering stage; if cut later it becomes tough and unpalatable. The crop grows so tall that it would be possible to cut it for hay or silage at a considerable height above ground level, thus leaving a long stubble quite adequate as a protection to the soil from wind. Rye grain also is valuable. Yields are not usually very high owing to the presence of sterile spikelets in the ear, but the feeding value of the grain to livestock is approximately equivalent to wheat.

The Value of Improved Stock Carrying Capacity.

As this subject was dealt with in an article by the writer, published last year and entitled "Increasing the Stock Carrying Capacity of Mallee Farms," it will not be exhaustively discussed here. It is of extreme importance in the control of wind erosion, as by this means maximum ground cover is obtained and maximum organic matter returned to the soil.

Farms may be ruined by sand drift unless farming methods are changed.

The factor likely to be of greatest assistance is the adequate supply of superphosphate. All of these lands are very deficient in phosphate and the amount usually supplied to cereal crops rarely leaves much reserve for following pastures. In the presence of adequate phosphate, even poor quality sandhills, where the annual rainfall is from 14in. upward, will grow a mixture of grasses and naturalised clovers that will provide good sheep grazing.

Examples have been noted where such country is carrying 1 to 1½ sheep per acre throughout the year and still giving adequate cover so that the land does not drift.

It is certain that pastures on land receiving 14in. to 17in. of annual rainfall can utilise profitably at least ½cwt. super per annum, and where the rainfall is lower at least 40lbs. per annum should be provided. It is often stated by farmers that this mallee country will not stand up to extended pasture periods, grasses and clovers gradually being replaced by weeds and various bush growths, and so they claim that cultivated crops are necessary. While it is certain that occasional cultivation is likely to be advantageous, especially where Wimmera Rye Grass has been established, the deterioration of such pastures is much more likely to be due to lack of phosphate than to lack of cultivation.

Wimmera Rye Grass should be used right throughout this country. Even in low rainfall areas it will establish itself very well, will provide more bulk than any other grass, with consequently more residue to cover the ground during the summer months when wind erosion is worst. While Wimmera Rye Grass prefers heavier types of soil, it can be established very well on sandy land by sowing 2lbs. or 3lbs. per acre with or without a cereal crop, provided only that sufficient phosphate is supplied with it. Without adequate phosphate it fails on this class of soil.

Wimmera Rye dominates the pasture far better if the land is given some cultivation about every second year. This can be done when top dressing the pasture by using a combine instead of a broadcaster or drill, doing the work during the winter when the land is not likely to drift.

Nature herself has done something recently which will be of considerable assistance though these areas in the improvement of stock carrying capacity and in the control of eroded soils, and this is the bringing of Mediterranean Grass to the Murray mallee by wind-borne seeds from the northern areas. This grass, which appeared only five or six years ago, is rapidly becoming the most common naturalised species. It is hardy and vigorous, very palatable, and also nutritious to stock, and being a short-lived perennial and not an annual provides fresh growth after summer rains which no other grass species has done previously in these localities. As the seed is wind borne, the area growing this species is increasing very rapidly, and it shows no aversion to establishing itself on any class of soil, even on loose sand dunes.

The Importance of Controlled Grazing.

It is useless to provide better pastures and to grow cereal crops for grazing and fodder reserves to feed livestock unless such livestock are adequately handled Bad drifts can be caused by farm animals just as easily as by cultivation if the land is overstocked or if the livestock are left for too long a period in any particular area. The common practice at present of putting a comparatively small number of sheep in a paddock hundreds of acres in extent and leaving them there indefinitely is a quite usual cause of soil erosion. The sheep wander all over the paddock seeking the more palatable pasture species, form tracks from which drifts start, and congregate periodically at watering places, tramping the surrounding area into dust and again starting drifts. The eating out of all the growth around watering places and subsequent tramping of the soil seems to have been one of the causes of the erosion in the pastoral areas.

To control the grazing on farm lands paddocks must be small, with facilities for watering in each of them. Only by such means can areas be grazed over rapidly and evenly and stock removed while some ground cover remains. Modified rotational grazing of this kind will not only help to prevent drift, but will be an advantage to health and condition of the livestock, also enabling a larger number to be kept with safety.

Grazing cannot be controlled with certainty, also, unless the rabbit population is reduced to a minimum. This is one of the most difficult factors in the pastoral areas, but should not be impossible in farm lands if concerted action is taken.

In other countries where soil erosion is a menace, strip cropping has been adopted This means long, narrow paddocks which, when water erosion is the trouble, are bounded by contour lines, though this is not necessary for the prevention of wind erosion. In both cases, however, the principle is the same —crops, pastures, fallows, &c., are alternated in these paddocks so that neither water nor wind gets a wide sweep over any particular treatment of the soil and thus harmful effect is checked. Something of this kind will be an advantage in our eroded country. Where sandhills and clay flats alternate with any regularity, eventually it will be found necessary to divide the sandhill by fencing from the flat so that each may receive the treatment most useful to the soil type. Where the whole, or the greater part of the land is sandy, long, narrow paddocks, narrow from east to west, in the direction of the prevailing winds and long from north to south, will be a very decided asset. If the rotation is then so arranged that no two of these paddocks adjoining ever have a bare land surface at the same time, the harmful effect of wind erosion will be reduced to a minimum.

The effects of wind erosion

Cultivation Practices to Control Erosion.

The practice of bare fallowing is rightly considered by wheat growers to be essential if maximum results are to be obtained. This practice, however, consisting as it does of soil stirring in the early winter and the retention of a loose, bare surface throughout the spring, summer, and autumn months, while it is ideal preparation for the ensuing cereal crop, is also the condition which allows wind to do most damage to the soil. Under such circumstances both sheet and gully erosions start, which means that sometimes the whole land surface is swept bare, while at other times the surface is blown into a series of ridges and hollows which ruin the land for some time, if not permanently.

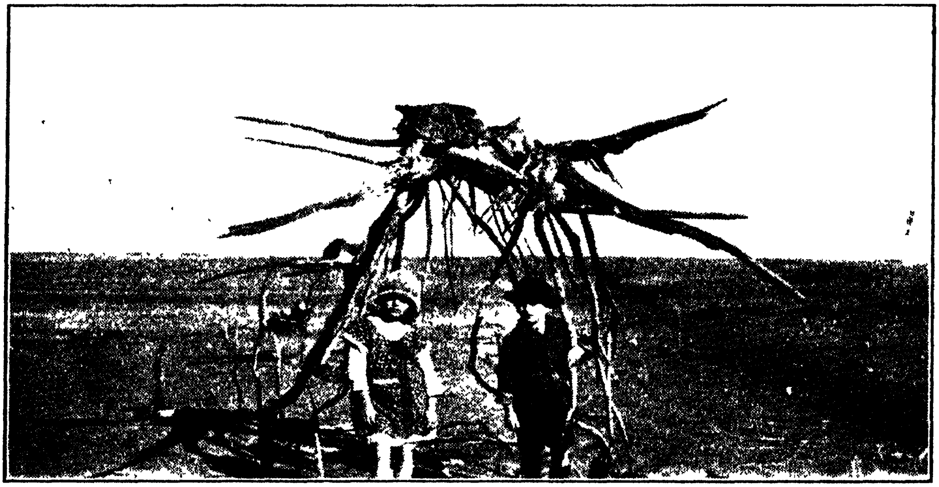
It is not desired to disparage the value of bare fallowing, but to point out that on soils very subject to sand drift bare fallow is not possible and that a modification of methods is useful, not only to control the drift, but also to give better crop results than those from badly drifted fallow. Sometimes only a slight modification is necessary Ploughing at the ordinary time, leaving the land as rough as possible and using sheep instead of cultivators to deal with weed growth, working the land only prior to seeding in the autumn often stops excessive drift. To be successful with this method small paddocks and a large sheep flock are essential so that weed growth may be dealt with quickly and the sheep moved elsewhere.

Of the Eucalypts, the Sugar Gum and Tuart Gum have proved free growers, and there are other species which would probably do equally well.

The Pepper Tree is growing in many mallee areas, while the Tamarisk grows freely from cuttings placed in the ground.

Other species which may be grown are beautiful ornamental flowering trees, such as the Kurrajong and Lagunaria. The Carob will also grow and provides, in addition to shade and shelter, an edible bean much relished by livestock. The Olive, too, while slow growing, has proved to grow successfully, even in our lowest rainfall agricultural areas.

With such a variety to choose from no farm should be without its break winds of timber.



Evidence of excessive erosion from hilltop. Original soil surface was on top of this stump.

The methods suggested will all help in the control of shifting sand, but in order to proceed along these lines much expenditure of labour and some expenditure of capital will be necessary. Even with the best methods improvement will be slow and patience is required. Just as it took a period of years before wind erosion became an acute problem, so in the reclamation many years may elapse before any great improvement is noted.

Under improved methods, however, there is a definite hope that the drift may be checked and eventually controlled, whereas under close rotation cereal cropping systems as practised by many at present there is no chance at all, and much of this country must eventually return to a series of moving sand dunes which will support little or no population.

Summary.

(1) Wind erosion is a serious problem in some of the agricultural as well as the pastoral areas of South Australia. Farms are losing fertility, while buildings, fences, roads, and railways are seriously damaged.

(2) Practically all countries of the world have problems connected with wind or water erosion. Old civilisations have been wiped out of existence by it, and it is generally recognised as one of the most important problems to be faced by farmers and pastoralists.

(3) The causes of wind erosion are:—

- (*a*) Soil types with particles of even size which have little cohesion. Sandy soils are the worst types.
- (*b*) The removal of natural cover, allowing wind to sweep unrestricted over large areas.
- (*c*) Methods, including the use of fire, which destroy soil humus and provide nothing to replace it.
- (*d*) Overcropping, including bare fallow periods, which reduces fertility and further depletes soil humus.
- (*e*) Overgrazing, leaving the surface bare and starting drifts from the tramping of stock. Rabbits are partly to blame for this condition.

(4) Control methods must have for their objective the keeping of some cover over land subjected to erosion all the time and a farming system which will restore and not further deplete the humus content of the soil.

(5) Wide rotation methods, including a minimum of the growing of cereals for sale off the farm and a maximum of pastures, including Lucerne and cereal crops fed to livestock on the farm, are essential.

(6) The building up of a stock-carrying capacity on pasture land by the liberal use of superphosphate to promote growth and better species, also the use of plants such as Wimmera Rye Grass will help considerably.

(7) Controlled grazing, including subdivision into small paddocks and the provision of many watering places so that livestock may be handled judiciously, will prevent overstocking and the consequent trampling of farm animals starting erosion. To control the grazing, rabbits must be reduced to a minimum.

(8) Modified cultivation practices, leaving no bare land surface as in usual fallow, but instead leaving stubble or grass residues on top of cultivated land, or planting such land sparsely with oats or rye, and keeping in control by sheep, are necessary. In extreme cases all fallowing must be avoided.

(9) Wandering sand dunes must be controlled. This can be done initially by planting rye or by spreading bushes on the surface, afterwards by various sand-binding plants, and finally by planting with bamboo or trees.

(10) The planting of timber belts on sand dunes, also along subdivision fences, will break the force of the wind and also provide necessary shelter shelter for livestock.

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Widespread Aphid Attack on Artichokes

[By WORSLEY C. JOHNSTON (District Agricultural Instructor).]

The Wild Artichoke (*Cynara cardunculus*), a plant of widespread distribution throughout the northern areas of the State, is one that is regarded with varying degrees of economic importance by agriculturists and pastoralists. Many are the farmers who will champion the virtues of the plant, and equally there are those who regard it as rank weed. Whatever the personal view of the reader, it must be admitted that the plant serves some useful purpose, and produces feed under some conditions of soil and climate where it would be difficult to replace the plant with better and more vigorous types of plants.

It is not the purpose of this note to enter into a discussion on the value of the plant, but to record the heavy infestation of an aphid on it in the seasons of 1935 and 1936.

The Occurrence of the Aphid.

In the early spring of 1935 it was observed that the artichokes along the valley of the Wakefield River were very much debilitated. It was noted that wherever the lack of vigour was pronounced, the plants presented a sooty appearance. On investigation this was found to be a black-coloured mould, which would easily rub off the leaves. More careful examination showed that the plant was the host of large numbers of a greenish-coloured aphid, which was to be found on the undersides of most leaves, and also, as is the habit of aphides, on all the young growing points of the plant. Through an oversight and the belief that it was perhaps only a seasonal epidemic, no specimens were taken during the 1935 season.

In 1936 the effects of the aphid were noticed over a very widespread area, which embraced the whole of the area traversed by the writer's district (the Lower North). The intensity of the attack appeared to be greatly increased, so that the plant was reduced so severely that its growth was only a fraction of normal. Specimens were taken and forwarded to the Waite Agricultural Research Institute for identification of the aphid.

Identification.

Through the courtesy and assistance of Dr. Davidson the aphid was identified as belonging to the genus *Capitophorus*. In a letter to the writer Dr. Davidson states:—"So far as I know the species you sent has not been recorded on this thistle before." Up to the time of writing it has not been possible to be certain of its specific identity, so that for the present all that can be done is to refer to it as *Capitophorus* spp.

Internal Parasites and Parasitic Diseases of Sheep.

The Library of the Department of Agriculture acknowledges the receipt of a volume—bearing the above title—from the Publishers, Messrs. Angus & Robertson of Sydney. This book is compiled under the joint authorship of Dr. Clunies Ross and Mr. H. McL. Gordon, B.V.Sc., the two leading authorities on the subject in Australia, and is based mainly on researches made by the authors under Australian conditions. It contains the latest and most up-to-date methods of prevention and treatment.

It can be confidently recommended to students as a text book, and will prove invaluable to the veterinarian and flockmaster, and other persons interested in the sheep industry.—Price 25s.

The following replies to questions submitted at Conferences of the Agricultural Bureau have been given by Mr. W. J. Spafford (Director of Agriculture.)

Has the Growing of Soya Beans any Possibility in the Murray Mallee, and what use could it be put to as a Fodder?

Soya Beans make their principal growth in the late spring and summer, and as a consequence, are grown in sub-tropical conditions or where spring and summer rainfall is the rule. Of recent years efforts have been made to develop varieties suitable for winter-rainfall climates, but with partial success only. Because of the work being done, it is possible that some day Soya Beans may be successfully grown in similar conditions to those obtaining in the Murray Mallee, but just now the crop is not at all promising for such localities.

Soya Beans are grown for the seeds produced, and although the plants have some use as a green fodder, it is seldom looked upon as important in this regard.

What is the most Suitable Variety of Barley for the Pinnaroo District to be used for Pig Feeding?

Of the varieties of barley commonly grown in South Australia, best results would probably be secured in the Pinnaroo district from Roseworthy Oregon. In good seasons this variety is inclined to grow a little too luxuriantly, but on the average would give really good results. It should be sown after the seeding of the wheat crops has been completed, using about 40lbs. of seed and about 70lbs. of superphosphate per acre.

When being fed to pigs, crushed barley gives better results than does whole grain, and soaked grain has an advantage over dry whole grain. Where skim milk is not available, from 8oz. to 10oz. of a pig meal or meat meal as well as barley should be given each day to growing pigs, and, if possible, green feed of some kind should always form part of a pig's ration.

Oats versus Barley for Lambs.

"Which has the better fattening qualities, oats or barley for lambs, and should it be crushed for best results?"

It was the usual experience of people who feed sheep with concentrated foodstuffs that barley is one of the best grains which can be used for the purpose, and that barley is a good deal better for the purpose of fattening the animals than oats. A comparison of the starch equivalent figures of the two grains, barley and oats, show their relative fattening qualities, and these are for average South Australian barley 72 per cent. and for average oats about 59 per cent.

Lambs fatten on less barley if crushed than if fed whole, but it is fairly expensive to grind grain, and the ground material is not so convenient to give to lambs as is whole grain, and as a consequence it is generally more economical to provide untreated barley.

If grain is to be fed to sheep of any age on a dry patch of land, it should never be run in lines, but should be put in very small heaps about 4ft. apart, and the heaps must not be placed in a straight line, but in semicircles or in "S'S," then very little is tramped into the soil and the weaker animals soon learn to cut off corners and so get a fair share of the feed instead of being robbed by the stronger sheep when the grain is in straight lines.

Does Ploughing in Stubble Prevent Drift?

The drifting soils of the Murray Mallee are of such a sandy nature that they are not likely to be compacted together by incorporating in their mass even a large quantity of organic matter, and so ploughing-in stubbles will not correct bad cases of drift. On the other hand, if the stubbles are left on the surface of the soil at fallowing time, the organic matter is of the greatest of use in keeping down the drift trouble. After harvest, sheep should be grazed on the stubbles to clean up the flag and softer portions of the straw, and so thin-out the stubbles, and then, without burning, the land should be fallowed with a cultivator, but not with a plough. Fallowed to a shallow depth in this way most of the stubble is kept right on the surface, and does an immense amount of good in preventing drift.

Feeding Tests at Parafield Poultry Station

[By C. F. Anderson, Government Poultry Expert.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April, 1935, to 31st July, 1936.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal, 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

Mash, during autumn and winter.—Crushed barley, crushed wheat, chaffed greenfeed and meatmeal. During spring and summer the mash is varied, bran being substituted for the crushed barley.

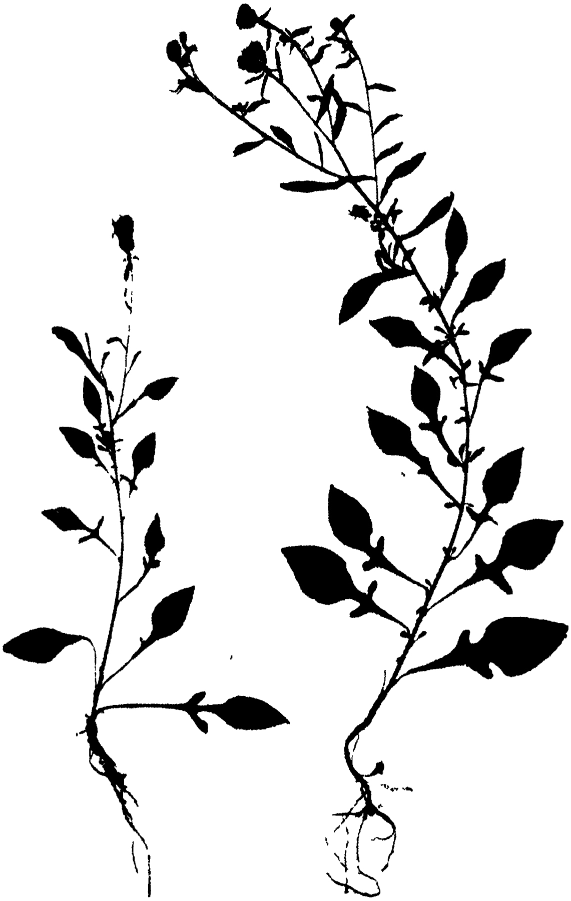
Grain.—2ozs. wheat per day.

	No. Eggs Laid 1st April, 1935, to 30th June, 1936.	No. Eggs Laid Month of July, 1936.	Total Eggs Laid 1st April, 1935, to 31st July, 1936.
No. 1 Test	8,208	422	**8,630**
No. 2 Test	8.399	384	**8,783**
No. 3 Test	9,082	506	**9,588**
No. 4 Test	7,251	433	**7,684**
No. 5 Test	7.419	454	**7.873**

Centaurea Nigrescens, Willd., A New Plant

The discovery of a species of "Centaurea" growing in an old garden near Millicent by Mr. E. S. Alcock (District Agricultural Instructor for the South-East), and since identified by Mr. J. M. Black as "C. nigrescens," Willd., adds one more to the total of six species of this large genus recorded to date for South Australia.

The plant belongs to middle and southern Europe, and is said to occur as a roadside weed throughout France, Switzerland, Italy, and Austria. In the European Floras it is described as a much-branched perennial 1-2½ft. high, usually quite glabrous, but sometimes with a sparse covering of hairs. The leaves are mostly oblong-lanceolate in shape, and are somewhat rough. They have toothed or sinuate margins, but are not usually incised or divided as they are in some other *Centaureas* as for example in the Star Thistle (*C. Calcitrapa,* L.). The flowers are purple and occur in heads of medium size. The flowerheads occur either singly, or in groups of 2-4, and each is surrounded by a protective involucre of bracts which are somewhat loosely arranged. The bracts terminate in ciliated appendages of a darkish colour; hence the specific name *nigrescens* (literally "blackish").



Centaurea nigrescens, **discovered in an old garden near Millicent.**

Of the 500 or so known species of *Centaurea* several are of importance as weeds, either as free-seeding annuals like the Star Thistles and Cockspurs, or as long-lived perennials. *C. nigrescens* belongs to the latter group. It resembles Knapweed (*C. nigra,* L.) and Russian Knapweed (*C. repens,* L.) in having an underground system from which new aerial shoots are produced each year. Such plants are sometimes difficult to eradicate, and are liable to be spread by cultivation. Fortunately, neither *C. nigrescens* nor *C. repens* appears to seed very freely; if left undisturbed they spread only slowly by the local growth of their underground parts.

As regards eradication the best plan, in the case of small patches, is to dig the plants right out, taking care to remove all parts of the underground stems. If the area affected is too large for this to be practicable, then three applications of a 10 per cent. sodium chlorate spray, applied at intervals of 6-8 weeks between December and April, should prove effective.

Mottle Leaf in Citrus

At the request of a member of the Beetaloo Valley Branch of the Agricultural Bureau the Chief Horticultural Instructor (Mr. A. G. Strickland, M.Sc.) has prepared the following statement relative to an investigation into Mottle Leaf in Citrus.

Examination of root specimens taken from unthrifty trees on your grove has disclosed heavy infestation with citrus nematodes (*Tylenchulus semipenetrans*).

The nematodes are small microscopic worms which bury themselves in the tissues of the fibrous roots and suck the sap therefrom. On badly infected trees, the small roots are severely injured; soil particles cling to small roots, owing to the presence of gelatinous material in which eggs are embedded, and on badly affected roots, the bark of the root readily strips away from the central woody stand. There is also a scarcity of healthy growing tips on badly infested trees.

Notwithstanding the above, citrus trees may have their roots somewhat infested by nematodes, and still show no apparent injury, provided that they have favourable growing conditions in other respects; this aspect of the matter will be dealt with below.

The pest is easily spread on nursery trees from infested areas; I have been told by Mr. J. B. Harris that he thinks you obtained your most recently planted (and worst affected) trees from the Salisbury district. It would be interesting to have definite information on this point, in view of the fact that citrus nematode has been recently found fairly widely distributed in the Salisbury area.

Irrigation water or storm water will carry nematodes from one part of a grove to another, and the pest may also be spread by implements, feet, &c., which transport moist soil from one place to another.

Up to the present time, no satisfactory method of eradicating or controlling the nematode has been found. It is known, however, that under good cultural conditions fairly healthy citrus trees may be maintained despite the presence of nematodes on roots.

The excessive multiplication in some instances is often due to other adverse factors which weaken trees sufficiently to permit the nematode to gain the upper hand.

In so far as your grove is concerned, there are several possibilities which I propose to deal with in detail.

1. *Salt Content of Soils and Irrigation Water.*

The analysis of soil samples taken from your property in 1935 showed the presence of salt in quantities higher than is consistent with the maintenance of good tree health. Various samples taken down to 3ft. in different parts of the grove showed salt contents ranging from 0.014 per cent. to 0.198 per cent.

The well water which had been used for irrigation purposes contained 96.2 grains per gallon of soluble salts.

The salt contents of the soil were undoubtedly higher than desirable; in this connection, I might state that at Tresco in Victoria, a concentration of sodium chloride of 0.05 per cent. was found to be inimical to the health of citrus trees in association with citrus nematode. To quote from a report on investigations at Tresco, Victoria:—

> It may be that on soil which is chemically and physically suited to the growth of citrus, the trees growing vigorously, and possessing a large leaf area, can send out new fibrous roots as fast as, or faster than the nematodes can impair their efficiency. If, however, the tree receives a setback in a soil which becomes too saline for optimum growth, it soon becomes rather thin in the foliage and the leaves from their chlorotic appearance, are seen to be relatively inefficient. Under such conditions, it is probable that the fibrous roots are injured by the nematode at a faster rate than new ones can be grown.
>
> In other words, adverse soil conditions can alter the balance which permits a normal tree to grow in association with the nematode; and when this balance is upset, the nematode may definitely contribute to the ultimate death of the tree.

On the evidence available, these remarks can be taken to apply fairly well to the probable state of affairs on your grove.

2. *Introduction of the Nematode.*

In view of the fact that high soil salinity was noted throughout both healthy and affected trees in your grove, there is a possibility that the nematode is firmly established only on trees which have been planted comparatively recently, *i.e.*, the trees may have been infested with the nematode when planted.

From the information available at this juncture, the following suggestions are made:—

(*a*) If feasible, use only reservoir water, and use it as copiously as possible in order to disperse in depth, and maintain at depth, harmful salts. The use of a flood or semi-flood type of irrigation is highly desirable.

(*b*) No method of eradicating the nematode is known; the organism can live in the soil for many years—even after removal of trees. Efforts in the immediate future must be directed at maintaining in as vigorous condition as possible, such trees as are still healthy or moderately healthy. Salt must not be permitted to concentrate in the upper soil layers, and flood irrigation with reservoir water has already been suggested. The return of seasons of heavier rainfall should, in itself, assist materially in leaching down salt accumulations. Other practices suggested are the regular growth and incorporation with the soil of winter green crops; the use of artificial fertilisers (particularly sulphate of ammonia); and regular pruning with the object of removing dead brushwood and admitting light and air to the trees.

(*c*) Trees which are beyond reasonable hope of recovery should be removed; in the place of such removals, I would very much like to see a trial planting of trees on Seville stock. It was noted on a property at Salisbury that trees on Seville stock were maintained in good health, whilst trees on Rough Lemon stock were definitely unthrifty. It has not yet been possible to account fully for this circumstance, but there is a possibility that the Seville stock is more suitable where citrus nematode and soil salinity are factors of importance.

Wheat Prices at Port Adelaide and Thevenard.

The following statement comprises replies by representatives of the wheat trade to the question asked at the Ceduna Conference: "Why is there a difference in the price of wheat between Port Adelaide and Thevenard?"—The difference in price at the time (½d. per bushel) was due mainly to two factors (1) the facilities for milling at Port Adelaide where it is possible to obtain a home price for flour, approximately £2 10s. per ton above export parity (2) Shipping facilities. As far as full cargoes are concerned, there was no difference between the two ports, but at Port Adelaide it was possible to ship wheat in what are termed "parcels" (50 to 500 tons) at almost any time, big boats such as the "Nestor" taking parcels of wheat to complete their cargoes. At Thevenard, this practice is not possible, on account of the small amount of shipping and, therefore, it was necessary to charter a vessel to take a full cargo which might take some time to accumulate.

At jetty ports the practice was to unload into a stack at the shore end of the jetty and the wheat was then loaded into trucks and shunted along the jetty, which necessitated a charge to cover the extra handling and railway shunting charges. In addition to the foregoing, it was pointed out that any commodity had an increased value to buyers at Port Adelaide over its value at country towns.

Egg-Laying Competitions

Official Single Test conducted at Parafield

[Review of the Competition by M. W. Aird (Assistant Poultry Expert) and A. Clifton (Competition Attendant).]

The test commenced on 1st April and terminated on 31st July, and is known as the "Winter Test."

Sufficient entries were received to fill the whole of the pens available (501) this year. In the Wet Mash sections 474 pullets were entered and 27 pullets in the Dry Mash sections.

The production has been quite satisfactory. The highest score produced by any one bird for the four months was 97 *first grade* eggs in 122 days, laid by a Black Orpington pullet entered in the Boy's Home Project Section This bird also had the longest sequence to her credit (15 eggs in 15 days). The performance put up by this bird to date was a most creditable one, and if she continues on similar lines througout the duration of the test, she will get very close to the 300 egg mark for the full 12 months.

The gross weight of the mash fed to the 501 birds each day at the commencement of the test was 85lbs. 13ozs., made up as follows:—Bran 16lbs., pollard 16lbs., wholemeal 16lbs., meatmeal 5lbs., linseed meal 2lbs. 8ozs., charcoal grit 5lbs., salt 5ozs., chaffed green feed 25lbs.

On 1st June, on account of the birds producing better, and consequently having better appetites, the gross weight of the mash had to be increased a little.

In addition to the mash, the birds received 2ozs. of wheat each per day; a portion of the 2ozs. being fed at midday and the remainder in the evening. In addition, they were supplied with shell grit, charcoal grit and stone grit in hoppers, to eat as much as they desire.

The number of deaths to date have been considerably below the average; only five birds have died. This was probably due to a large extent to the absence of inferior birds, which often moult within a short while after the start of the test and eventually pass away. This class of bird is no doubt lacking in the constitution that is necessary for a pullet to carry on through a full 12 month test.

A feature of this year's test to date has been the success of the birds competing in the Dry Mash sections, the leading scores in these sections being slightly better than those in the Wet Mash sections.

The daily average production for:—

		Per Cent.
April ..	157 first grade eggs, equals	31.3
May	232 first grade eggs, equals	46.3
June	265 first grade eggs, equals	52.8
July . ..	226 first grade eggs, equals	45.1

By 1st July it was necessary for the eggs classed as first grade to be 2ozs. in weight, and this fact accounts to a large extent for the July daily average falling below that for the month of June.

LEADING SCORES TO 31st JULY, 1936.—FIRST GRADE EGGS ONLY.

SECTION I.—WET MASH.

Class 1.—White Leghorns—**351 birds competing.**

	Eggs Laid.	Birds Nos.
Singles—		
V. E. Williams	91	109
E. Portlock	90	56
W. Sickert	88	177
Willow Bend Stud	88	186
Trios—		
A. O. Dawkins	240	85–87
W. H. L. Norman	238	307–309
Willow Bend Stud	237	184–186
Teams—		
A. O. Dawkins	456	85–90
Willow Bend Stud	427	295–300
E. Portlock	423	55–60

Class 2.—Any other Light Breed (Minorcas)—**15 birds competing.**

	Eggs Laid.	Birds Nos.
Singles—		
V. F. Gameau	55	366
Langmaid and Bettison	53	358
R. M. Yelland	51	372
Trios—		
Langmaid and Bettison	131	358–360
V. F. Gameau	116	364–366
Teams—		
Langmaid and Bettison	191	358–363
V. F. Gameau	188	364–369

Class 3.—Black Orpingtons—45 birds competing.

	Eggs. Laid.	Birds Nos.
Singles—		
Willow Bend Stud	82	379
A. G. Dawes	80	377
Willow Bend Stud	80	384
Trios—		
Willow Bend Stud	235	382–384
Willow Bend Stud	221	379–381
K. Pennack	188	394–396
H. J. Mills	188	388–390
Teams—		
Willow Bend Stud	456	379–384
A. G. Dawes	339	373–378
K. Pennack	337	391–396

Class 4.—Any other Heavy Breed—36 birds competing.

	Eggs. Laid.	Birds Nos.
Singles—		
Willow Bend Stud (Rhode Island Red)	83	429
A. G. Dawes (Rhode Island Red)	81	421
Willow Bend Stud (Rhode Island Red)	78	424
Trios—		
A. G. Dawes (Rhode Island Reds)	208	421–423
Willow Bend Stud (Rhode Island Reds)	189	424–426
A. G. Dawes (Rhode Island Reds)	186	37–39
Teams—		
A. G. Dawes (Rhode Island Reds)	332	418–423
Willow Bend Stud (Rhode Island Reds)	325	424–429
K. Pennack (Barnevelders)	316	436–441

SECTION II.—DRY MASH.

Class 5.—White Leghorns—15 birds competing.

	Eggs. Laid.	Birds Nos.
Singles—		
A. O. Dawkins	93	449
Willow Bend Stud	84	454
A. O. Dawkins	79	452
A. O. Dawkins	79	453
Trios—		
A. O. Dawkins	231	451–453
A. O. Dawkins	227	448–450
Willow Bend Stud	218	454–456
Teams—		
A. O. Dawkins	458	448–453
Willow Bend Stud	368	454–459

Class 7.—Black Orpingtons—6 birds competing.

Singles—		
Willow Bend Stud	87	468
Willow Bend Stud	74	466
Willow Bend Stud	74	463
Trios—		
Willow Bend Stud	228	466–468
Willow Bend Stud	152	463–465
Teams—		
Willow Bend Stud	380	463–468

Class 8.—Rhode Island Reds—6 birds competing.

Singles—		
Willow Bend Stud	92	470
Willow Bend Stud	87	472
Trios—		
Willow Bend Stud	224	469–471
Willow Bend Stud	219	472–474
Teams—		
Willow Bend Stud	443	469–474

SECTION III.—WET MASH.

Class 9.—Any Breed—27 birds competing.
(Home Project Section.)

Name.	School.	Breed.		
David Hart,	Unley High	(Black Orpington)	97	495
John Short,	Hamley Bridge	(White Leghorn)	81	479
Anthony Rix,	Williamstown	(White Leghorn)	80	478

Drill or Combine for Seeding.

At the Kimba Conference held in August, a member of the Miltalie branch asked why crops sown with the drill gained higher points in Crop Competitions than crops put in with the combine. He quoted from a statement made by Mr. C. Schulz of Morchard in the June issue of the *Journal* to the effect that 9 out of 10 crop competitions had been won with crops sown with the drill.

Mr. H. D. Adams, District Agricultural Instructor, stated that so far as the competitions on Eyre's Peninsula were concerned, the results were distinctly in favour of the combine.

Agricultural Bureau of South Australia

Conference at Karoonda

Indications of a brighter seasonal outlook than has been the case for some years past, was evidenced by the very much better representation of delegates from the Murray Lands West Branches of the Agricultural Bureau which met in Conference at Karoonda on 21st July. Conducted for the first time under the auspices of the Yurgo Branch, the Conference was a most successful one, both from the point of view of attendance and sustained interest in the subjects introduced for discussion. Mr. J. Bullen (Chairman of the Yurgo Branch) presided; the opening address being given by Mr. A. J. A. Koch (Member, Advisory Board of Agriculture). "Gardening in the Mallee" was the subject of a paper read by Mr. H. Sanders (Yurgo), and Mr. A. Hood (Wynarka) dealt with "Sheep on the Farm." Other papers read were "Breeding Percheron Horses" Mr. W. J. Morcom (Lameroo); "Marketing Farm Produce," Mr. H. McKenzie (Yurgo), and "The Farm Flock and Shearing," Mr. W. R. Trestrail (Coomandook) Mr. R. Elliot (Kulkawirra) gave a demonstration of telling the age of a horse, and Mr. R. C. Scott (Chief Agricultural Instructor) addressed the Conference on "Rugging of Sheep."

It was decided that next year's Conference should be held at Karoonda, the arrangements to be in the hands of the Coomandook Branch. The following resolutions were carried, "That where land values have not been reduced to a reasonable figure, steps should be taken to give immediate effect to this"; "That Conference urge on District Councils that the simultaneous destruction of foxes be made compulsory"; and "That the Advisory Board of Agriculture approach the South Australian Railways for a railway weighbridge to be installed at Karoonda."

The evening session was devoted to an address given by Mr. W. J. Spafford (Director of Agriculture) who spoke on "The Future Development of the Murray Mallee."

Conference at Eyre's Peninsula (East)

The Branches of the Agricultural Bureau on the eastern side of Eyre's Peninsula held their Conference at Kimba on 4th August, under the auspices of the Kelly Branch.

Mr. A. A. Freeth presided, and the Hon. A. L. McEwin, M.L.C. (Chairman of the Advisory Board of Agriculture) delivered the opening address. Papers were read by Mr. N. G. Stewart (Butler) on "Classing and Marketing the Farm Clip"; Mr. S. B. Castine (Kelly), "An Effective and Economical Sheep Mustering Yard"; and Mr. F. K. Parsons, "Blowfly Strike in Sheep." Officers of the Department of Agriculture replied to a long list of questions which had been provided on the agenda, together with questions which arose from discussions. The following resolutions were carried:—"That the Government immediately put work in hand to complete Urrbrae High School and give it residential facilities"; "That this Conference is of the opinion that at least one member of the Advisory Board should be appointed from Eyre's Peninsula"; "That this Conference is of the opinion that farmers are not receiving adequate agricultural instruction and suggests that the Department investigate this matter"; "That the Department of Agriculture be asked to print more members' papers in the *Journal*"; "That the Government be asked to introduce legislation to control straying dogs more effectively"; and "That the next Conference be held at Cowell under the auspices of the Miltalie Branch."

In the evening Mr. W. J. Spafford (Director of Agriculture) addressed the Conference on "Wheat growing in different soil types of the Kimba district."

Conference at Eurelia

Presided over by Mr. E. Hall (Chairman of the Eurelia Branch), branches of the Upper Northern districts held their Annual Conference at Eurelia on 15th July. The Committee of the local Branch and Mr. E. Wall (Secretary) are to be congratulated on having organised a very successful gathering. The attendance of delegates from district Branches was particularly good, and the papers and discussions which followed their reading were of a high standard.

Mr. F. Coleman (Member, Advisory Board of Agriculture) delivered the opening address, and the following papers were read and discussed:—"The Child, the School and the World," Mr. F. H. Stainer (Eurelia); "The Farmer of the Future," Mr. W. E. Koch (Eurelia); and "Rope Making," Mr. J. S. Hill (Wilmington).

Mr. C. A. Goddard (Assistant Wool Instructor, School of Mines) spoke on the preparation of a farmer's wool clip for market, and Messrs. R. C. Scott (Chief Agricultural Instructor) and C. F. Anderson (Government Poultry Expert) replied to questions.

The following resolutions were carried:—"That the 1937 Conference be held at Booleroo Centre"; and "That the Postal Department be requested to make a substantial reduction in telephone rents."

Mr. J. J. Modystach was congratulated on having been presented with a Life Membership Certificate of the Agricultural Bureau.

Conference at Pinnaroo

Representatives of Branches of the Bureau along the Pinnaroo Line held their Annual Conference at Pinnaroo on 23rd July.

Mr. A. O. Nietz occupied the chair and Mr. A. J. A. Koch of the Advisory Board of Agriculture delivered the opening address.

The following papers were read:—"Pruning the Pear Tree," Mr. A Fischer (Pinnaroo); "Wind Erosion of Soils in Agricultural Areas," Mr. R. L. Griffiths (District Agricultural Instructor), and Mr. C. A. Goddard (Assistant Wool Instructor, School of Mines)spoke on "Parasites of Sheep."

It was decided that the 1937 Conference should be held at Lameroo.

Mr. W. J. Spafford (Director of Agriculture) presented trophies to the successful competitors in the Chandos Crop Competition. These were as follows:—First—Mr. E. Ross (Parrakie), who also won the prize for the highest aggregate points over the past three years, and the trophy donated by the Millers' Association, second—Mr. R. Hamond (Lameroo) and third—Mr. J. S. Webb (Parrakie). The Junior Section was won by Allan Hutchens.

At the evening session, Mr. R. C. Scott (Chief Agricultural Instructor) spoke on "The Comparative Value of a General Purpose Farm Flock of Merino and Corriedale Sheep and Lambs, for Wool, Mutton and Lambs."

Purchases of English Stud Stock.

The Agent-General and Trade Commissioner, Mr. C. F. G. McCann refers, in a report dated July 27, to the continuous buying of stud stock by meat producing countries in order to keep their meat standards to the highest possible level. For a number of years the Irish Free State has purchased pure-bred livestock with the object of assisting and encouraging farmers to produce higher grade meats. Russia – through her experts who visit England regularly—has been a heavy purchaser of Shorthorns and Herefords and is now selecting Romney Marsh sheep. South Africa is confining their interests at present to Hereford cattle, whilst Agentine is devoting much greater attention to Southdowns. Large white pigs are being sought by all countries and inquiries have been fulfilled for Poland, Germany, France and Lithuania. Chiver's Stud just recently refused 300 guineas for a two-year-old boar which won several prizes of distinction at various important shows.

Advisory Board.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, 29th July, 1936, there being present:—Hon. A. L. McEwin, M.L.C. (Chairman), Messrs. R. H. Martin, F. Coleman, J. B. Murdoch, H. N. Wicks, J. W. Sandford, S. Shepherd, W. J. Spafford, A. J. A. Koch, Dr. A. E. V. Richardson, Prof. A. J. Perkins, and H. C. Pritchard (General Secretary).

Apologies were received from Messrs. A. M. Dawkins, P. J. Baily, and A. J. Cooke.

Election of Officers.—Hon. A. L. McEwin, M.L.C., was re-elected Chairman, and Mr. J. W. Sandford Vice-Chairman for the ensuing 12 months.

Re-appointment of Members.—The Honourable the Minister intimated that he had re-appointed the following as members of the Board for two years from 1st July, 1936:—Messrs. A. M. Dawkins, F. Coleman, H. N. Wicks, P. J. Baily, A. J. A. Koch, and A. J. Cooke.

New Branches.—Conditional approval was given to the formation of Branches at Blewett Springs (near McLaren Flat) and Smithville (Women's) (near Wilkawatt).

Life Members.—Approval was given to the addition of the following names to the roll of Life Members of the Agricultural Bureau:—R. Hentschke (Lone Pine), T. Fromm (Lone Pine), J. G. Christian (Lone Pine), F. Fromm (Lone Pine), F. Hooper (Block E), J. R. Ling (Nunkeri), H. Sanders (Nunkeri), L. J. Sargent (Gladstone), H. H. Myers (Mount Hope).

New Members.—The following names were added to the rolls of existing Branches:—Balhannah Women's—Mrs. W. Grow; Berri—W. H. Harris, E. R. Hampel, W. E. Rout, J. G. Beckwith, H. B. Pfeiffer; Blackheath—K. C. Powell; Black Rock—Francis Thornton, Jack Paterson, Jack Devitt; Borrika—T. O. Moore, H. H. Tonkin, E. L. Cowled, R. G. Bonython, G. H. Coombe, C. L. Bonython, C. W. Jones, H. Griffiths; Brimpton Lake—J. Meaney, J. Allen, H. Zimmermann, V. Guy; Brinkley—J. G. Peter, G. C. Martin; Cambrai—J. A. Pannach, A. Wiencke, A. Hutton, H. E. Hoad, R. Braunach, T. Fendler, O. Brown, J. Miller, H. Milne; Carey's Gully—Clive Badenoch; Chandada—Ernest G. Voumard; Chapman's Bore—L. Menadue; Chilpuddie Rock—J. Brodie; Echunga Women's—Mrs. G. Porteous, Mrs. Wiese; Green Patch—N. Hyde; Hilltown—H. E. Scott, T. E. Scott; Hope Forest Women's—Mrs. N. E. M. Farrell, Mrs. M. A. Weaver, Mrs. G. M. Collins, Mrs. M. A. Schroeder, Mrs. B. M. Stockwell; Kalangadoo—J. Haines; Kangarilla Women's—Mrs. Hilda Thorpe, Miss Kath. Baker, Miss Ivy Baker, Miss Belle Thorpe, Miss Phyllis Osmond; Koolunga Women's—Miss I. Behenna, Miss E. Palmer, Mrs. S. Burford, Mrs. A. E. Bessen, Mrs. E. Walladge, Mrs. G. P. Pedler, Mrs. J. H. Button, Mrs. F. Reichelt, Mrs. Pilkington, Miss F. Cooper, Mrs. H. Chase, Mrs. Lawry (sen.), Mrs. Freeman, Mrs. R. W. Fuller, Mrs. J. C. Lawry, Mrs. E. H. Palmer, Mrs. E. S. Sheidow, Mrs. D. G. French, Mrs. E. D. Whitehorn; Lenswood and Forest Range—S. Lawrance; McLaren Flat Women's—Miss M. Wickham; Meadows—R. W. Hibbard; Millicent Women's—Mrs. Iris Kemp; Miltalie—Robt. Smith, Allen Smith; Monarto South Women's—Mrs. R. E. Dohnt, Mrs. Martin, Miss R. Bretag, Miss V. Baum; Mount Pleasant—F. Staples, A. J. Murfitt; Narridy—John O'Shaughnessy; Nunkeri—Fred. T. Sweetman, Don. Sweetman; O'Loughlin Women's—Mrs. H. Gaden; Parilla Well Women's—Mrs. A. Thiel, Miss M. Blacksell; Pygery—E. Woodrup; Redhill—Rev. C. Doley, Merv. Coombes, J. O. Crouch; Snowtown—R. Piper, G. Piper; Strathalbyn—A. S. Deer, L. E. Stirling, C. H. Dunn, A. B. Potts, H. Laucke, J. Logan, J. G. Bowden, C. T. Norton, R. Norton, H. S. Davis, C. Lund, F. W. Thomas, H. C. Virgo, V. C. Ellery, I. E. Lever, E. R. S. Maidment, C. C. Elliott; Strathalbyn Women's—Mrs. H. J. Stowe, Mrs. H. C. Dunn, Mrs. F. Michelmore, Miss Eckert, Mrs. J. Logan (sen.), Mrs. Roy Maidment, Miss J. Elliott, Miss G. Westley, Miss Edmonds, Miss A. Clifford, Mrs. G. Phillips; Taragoro—David Smallacombe, L. D. Smallacombe; Waikerie—R. Lambert; Wallala—C. G. Zippel; Wasleys Women's—Mrs. Carmichael, Miss Stella Carmichael; Yadnarie—Kevin N. Gillen, Thos. S. Todd; Monarto South—R. E. Dohnt, F. A. P. Hocking; Milang—W. R. Ness; Balhannah—J. T. Thiele, J. Clark, A. V. Redden, L. Shepherd, E. H. J. Shaw, A. F. Altmann, H. H. Shillabeer.

Several items were taken in Committee.

Papers Read at Conferences

Citrus Production for Export—River Murray District

[E. R. Moss, Berri (Renmark Conference).]

On studying the report of Mr. Underwood, the Murry Valley Citrus Association's representative in London, and also reading a report from the South Australian Trade Commissioner, Mr. McCann on the condition of the fruit that was shipped last season from the Murray Valley districts of South Australia, it was quite evident that a great improvement was necessary in the general appearance of the fruit if growers are to secure a profitable footing in the markets of Great Britain. The chief objection to the fruit was the excessive blemishes on the skin, and the dirty appearance of a portion of the fruit.

The flavour of South Australian oranges has been highly commented upon, and the keeping qualities—especially early in the season—are fairly satisfactory, but there is room for improvement here, and ways and means of making improvements can only be done by experiments.

The main object of this paper is to point out ways in which citrus fruits can be produced to eliminate to a minimum the undesirable dirtiness and skin blemishes on the fruit exported. Before starting on that phase of the question, it is proposed to set down a few of the points which are necessary in cultural practices if our reputation as successful citrus growers is to be maintained. Great Britain is the market in view at present, and this market is open to all exporting countries, so that it will be seen that buyers have a wide range of fruit to select from, and if a share of this big market is to be secured, the fruit must be equal to, if not better than, any that is marketed in Britain, and to do this cultural methods must be scientific and quite up to date.

The climate in the River Murray Valley is ideal for the raising of citrus fruits. There are a few spots which in certain seasons suffer from frost damage, but the damage in these areas can be lessened if cultural methods are up to date.

To produce a good orange the trees must be kept in good heart, and the main essentials for this purpose are as follows:—Irrigation, cultivation, and manures. There is no question of which is first, second, and third of these essentials; each must be worked scientifically and systematically together.

Irrigation.

The orange tree being an evergreen, requires moisture the whole year round, and a severe shortage of water at any time which causes the tree to wilt upsets the whole system of the tree, and brings about damage in more ways than one. Firstly, the rush of sap if the tree is allowed to become dry at or near setting period causes a more than normal shedding of the young fruits, or if the dryness takes place during summer the irrigation then causes the false or out-of-season blossoming, with the result that the spring blossoming is not as prolific as it should be. Thirdly, dryness at any time during summer and autumn causes a check in the development of the fruit, with the result that the fruit when ripe, becomes thick and coarse in the skin, and the flesh becomes "raggy." This is the class of fruit to keep off the export market and local markets if we are to maintain our good reputation as suppliers of quality fruit. Another point which in some seasons has a bearing on quality, is the frosted fruit. Seasons occur occasionally when severe winter frosts are experienced, when the fruit becomes dried out and bitter to the taste. This position can often be combated by irrigations during winter. Often these frosty years are very dry, and if the land is allowed to dry out during the frosty period the damage to the citrus crop is then very much more severe than if the land is kept moist. After looking at these four points it can be clearly seen that the citrus land must be kept regularly moist throughout the year, and it is pleasing to note that the Irrigation Commission is prepared to help in this matter by granting extra irrigation for citrus. A word of warning must be sounded here; with the extra irrigations the water tables may be raised to a dangerous level, so that it is necessary to be very careful not to overwater. At each irrigation, as many furrows as possible should be run down each row, all the furrows flowing simultaneously, which means plenty of outlets in the channels. The water on the majority of land should not be allowed to run for more than six hours per row.

Cultivation.

One good 6in. ploughing of all the land, i.e., down the rows and another ploughing across at the end of July, is all the ploughing that is necessary, providing that the cultivator is put down as deeply as possible after each irrigation and rain during summer. This should be followed by the harrows to keep a deep and fine mulch over the roots during summer. Leave the land alone and do not cultivate during winter; that is until ploughing time. This will give weeds—or if cover crops have been planted—a chance to grow, and will give something to plough in for humus.

Manures.

Humus is an exceedingly vital element necessary in all Murray soils, and humus becomes quickly deficient under hot summer conditions, unless it is constantly being put back in some way.

The growing of cover crops between the citrus is the cheapest form of supplying humus until the trees become too big and it is practically impossible to grow cover crops on account of robbing by the trees and the lack of sunlight which is able to reach the crop. When cover crops can no longer be grown, humus must be supplied in some other way. Stable manure if put on at the rate of 10 to 15 tons to the acre, is excellent for this purpose. Sheep and poultry manure applied at the rate of 8 tons to the acre are also good, but it is often difficult to obtain these manures in sufficient quantities to be of any value. Lucerne and straw, or any rubbish that can be put into the land and rotted down, will help to build up the humus in the land.

Artificial Manure.

The best results from any artificial manure will not be obtained unless there is plenty of humus in the land. It has been proved conclusively that nitrogen plays the biggest part in the production of citrus. It has also been proved that phosphoric acid is lacking in the Murray Valley soils. Phosphoric acid is recognised as an essential plant food. Potash is present in the heavier land in sufficient quantities to meet plant requirements. but is not found in great quantities in the sandy and sandy loam country, on which the majority of the citrus trees grow.

Following on these deductions, it is concluded that the first application of artificial manure, which should be applied early in August, should consist of what is commonly known as a complete manure—the 4-4-1 mixture. It is of very great importance that the first application should be applied early, so that sufficient nitrogen is available to the tree at blossoming time. The better heart the tree is in at blossoming time—providing weather conditions are not too severe—the better will be the setting of the fruit.

As the citrus tree is a heavy feeder right throughout the year, it is advisable to give at least 2 more applications of a nitrogenous manure, preferably Sulphate of Ammonia. One application should be given near Christmas time and the next one in early autumn. The older and larger the tree becomes, so the quantities of manure will have to be increased.

Blemishes.

There are two causes of blemishes—insects, and to a much greater degree, the wind—which do considerable damage.

The damage done by insects is not very much to worry about. Certain seasons when thrips are very bad, they cause a certain amount of marking around the stem and top of the orange, and no effective means have been found to combat this insect. Other insects which occasionally mark fruit are small grasshoppers and grubs, but up to date these pests have not appeared in plague form on the citrus trees. If they do appear in great numbers, they can be effectively dealt with by fumigation.

During some seasons heavy winds are experienced in the late spring and early summer. These winds cause the fruit to rub against the limbs and twigs of the tree, and later on when the fruit is coloured, the markings show up very plainly. This trouble is very difficult to deal with, but if the following rules are observed, the damage can be cut down considerably. When an orange grove is exposed to prevailing winds, a wind-break planted on that side will protect the trees from a severe buffeting; and secondly, if the dead and spent wood is pruned out of the trees, the leaves will offer a greater protection for the fruit against rubbing the wood that is left. This pruning out of spent wood will also have a beneficial effect on the health of the tree. New growth will take the place of spent wood that is pruned out, and the thinning-out process during pruning will allow of more sunlight and a better circulation of air through the tree. Unless this pruning is done, not only will the markings on the fruit be greater, but the infestations from scale insects will be aggravated.

Red Scale and Sooty Mould.

Up to the present, Renmark, Berri, Waikerie, and the intervening districts have not been troubled to the same extent as have Mildura and Mypolonga with Red Scale. It is in the Berri district, but is being kept in check by compulsory spraying or fumigation. Last season all districts—owing to seasonal conditions—had a bad infestation of Brown or Mussel scale which causes Sooty Mould fungus on the fruit. The appearance of this Sooty Mould on the fruit when it was opened up in England caused Mr. Underwood considerable worry, and the value of the fruit depreciated.

Although this fruit had been washed or cleaned before it left the packing sheds, spores of the Sooty Mould were evidently still on the fruit when packed, and developed on the fruit while in transit to Great Britain. The question now arises what is the most satisfactory way of removing the cause of the trouble? I am against the washing of fruit for the removal of the smut, either by machine or hand; the less the fruit is handled during the packing process the less chance it has of being bruised, and the hand washing in some cases last season was very crude—even nailbrushes being used—in an endeavour to remove the mould. The best and most simple way is for the grower to eradicate the scale from the tree. Various ways have been tried to kill the scale—both Red and Mussel scale—with more or less success, but the most successful efforts so far have been obtained by spraying with White Oil and fumigation, or with both combined.

This season the Citrus Association at Berri invested in a fumigating plant in which Cyano Dust was used for fumigating. I operated this plant for the Association, and fumigated about 600 trees in the district—a few trees for Red and the remainder for Brown Scale. With Brown Scale the results were excellent in every case, some of the kills being up to 100 per cent., and the remainder between 99 per cent. and 100 per cent. Most of the growers that used the fumigating plant also did portion of their trees with the White Oil spray, and the kill in these cases was not so satisfactory. One grower considered he made a 70 per cent. to 80 per cent. kill, and others between 80 per cent. and 90 per cent. This, of course, leaves a fair number of scale to breed again next season if suitable conditions arise.

In the case of Red Scale the result from fumigation was not so satisfactory. It was rather late in the season when the plant was secured and started operations, with the result that Red Scale were on the fruit and it was difficult to kill all the scale on the fruit. The scale on the leaves was all killed; fumigation was done in May, but much better results would have been obtained if it had been done earlier before the scale became attached to the fruit. The practice in California is to spray with oil and then to follow in three to four weeks' time with a fumigation. This idea appeals to me, because any scale that is missed by the spray may be killed by fumigation, and there is no doubt that White Oil spray acts as a tonic to the bark and leaves of the tree.

Costs of Spraying and Fumigation.

Both costs are, of course, governed by the size of the trees. In comparing figures with several growers who have sprayed their trees, costs have varied a little where a grower has used a hand spray and where a power plant has been used. The power plant uses more spray, the extra pressure with the power plant forcing the spray more amongst the foliage. The costs have worked out at from 7½d. to 1s. 3d. per tree. The grower who did his trees for 7½d. followed this with another spraying, because the one spraying did not give a satisfactory kill, so that his two sprayings worked out at 1s 3d. per tree. It must be taken into consideration that the time taken in a second spraying could be profitably put into other work. The cost of fumigation has worked out at from 1s. 4d. to 1s. 10d. per tree, according to the size of the tree. Where it cost the grower 1s. 10d. a large proportion of his trees consisted of big mandarin and lemon trees. When comparing the costs of the two methods, consideration must be taken of the kill obtained. In fumigation, where a 99 per cent. to 100 per cent. kill has taken place, the trees will not have to be treated again for at least three seasons. But where the kill with spraying is only from 70 per cent. to 80 per cent. it will be necessary to spray each season. Looking at the cost from that point, fumigation appears to be the better method.

The points raised in this paper are not final, and there are probably arguments against them, but if the work is done somewhere close to the lines set down, South Australia can put on the export market an orange that will hold its own with anything in the world, and with the people of England becoming Dominion-minded citrus growing will be a profitable business.

Economic Disadvantages under which Primary Industries are Labouring

[W. W. Barnett, Laura Bay (Ceduna Conference).]

When viewing the intense scientific research and technical knowledge that has been applied in maintaining these industries to a reasonable point of productivity, the neglect of the business end of Primary Production represents much wasted human effort.

In addition to paying freights of their products to markets and freights back on the commodities they purchase, producers sell their products on an auction basis, or what the other fellow cares to give, while they buy the products of secondary industries at an out-of-proportion fixed price plus high distribution charges.

This latter is accorded by the high protection policy of the Commonwealth, in turn supported by the relatively high voting power of dwellers of cities and large towns. In addition to creating high internal costs and restricted purchasing power for producers, these trade barriers are the cause of lost overseas markets and are not in the best interests of international goodwill.

Producers would probably be better off if workers in secondary industries were paid by them to sit down, were they permitted to purchase their requirements in unrestricted markets.

Maybe the addition of a unit to the constitution of the Agricultural Bureau to deal with the aspects would help to bring in a full measure of increased production at a margin over costs, eliminating competition and substituting co-operation as implied by the name Commonwealth.

Plant Nutrition

[S. R. MORGAN, Nunjikompita (Ceduna Conference).]

I have abbreviated this subject to the three points of most importance to practical farmers, namely, manuring of soils; fallowing, and the part it plays in nutrition; and crop rotation. These three considerations bear such close relationship to each other that to understand one, we must study all three. They are the foundation of crop production.

Fertilisers.

The question of manuring of soils raises the further questions of "What does a crop require?" and "How much of it is present in the soil?" It should be the business of every farmer to investigate these problems, for his particular land, and then determine how much fertiliser and what kind he should apply to the soil to supply the deficiencies. The limiting factor in crop-production is the rainfall received during the growing months, that is, from March to the end of October. The average for this period in this district (Petina) is about 8.5ins., and as each bushel per acre requires about 30 points of rain, then it follows that in an average year we have sufficient rain for approximately 24 bushels per acre, allowing for evaporation and drainage of portion of the rain. As the average yield in this district is about 8 bushels per acre, and less in surrounding districts, then it appears as if we are not making full use of what little rainfall we do receive.

The chemicals absorbed by the plant determine how much advantage shall be derived from the rainfall. Upon inquiry into the materials which a crop of wheat contains, we find that approximately 12 per cent. is water, 85 per cent. is carbon compounds, and 3 to 5 per cent. is ash. The water is supplied by suitable seasonal rains and the carbon is obtained from the air in which it exists as carbon dioxide. As there is sufficient rain for 24 bushels, and as there is enough carbon dioxide present in the air, then the reason for obtaining only an 8 bushel average must lie in the supply, or the mechanical conditions surrounding the supply, of the small amount of ash. This remains after burning the plant and contains the chemicals absorbed by the plant's roots from the soil. Mineral matter is composed of several chemicals, all of great importance to the plant, and which must be present in the soil for the plant to obtain nourishment, since plants cannot live on air and water alone. Of these several chemicals, only three are ever likely to be deficient in our soils. These are phosphates, nitrogen and potash; indeed Australian soils are outstanding in their deficiency of phosphates, hence the extensive practice of applying superphosphates to these soils. As will be apparent later, some gain seems to be derived from application of nitrogenous fertilisers to stubble land.

When writing of the amount of chemicals present in the soil, I mean that fraction which is soluble in water or very dilute acids, because insoluble chemicals cannot readily be absorbed by the roots. This is analogous to the indigestibility of insoluble sand in the animal body, compared with soluble substances like sugar and salt which are easily absorbed.

The familiar marks of 45 per cent. W.S.P. printed on super bags refers to the fact that 45 per cent. is water soluble phosphate (W.S.P.). That is, only 87lbs. in each bag of super is of immediate use to the crop, the other 55 per cent. being insoluble phosphate, gypsum and sand. These two latter substances are left mixed with the active fertilizing material to prevent it absorbing moisture, and so becoming sticky, and also to dilute it, so that small amounts of the 45 per cent. can be sown through the seeding implement, which would be practically impossible if 100 per cent. of similar high percentages were being sown

There is a law in agriculture called the "Law of the Minimum" which states that it is the amount of the most deficient plant chemical in the soil which determines the smallness of the yield. Suppose, for instance, each bushel of wheat required 1lb. of phosphoric acid and 6lbs. of nitrogen. If we increase the phosphoric acid to 2lbs. without increasing the nitrogen, then as this law predicts, we cannot utilise the extra pound of phosphoric acid. If, however, sufficient quantities of nitrogen are present in the soil, then we would be justified in applying additional phosphates. It is this fact that all the other chemicals must be present in sufficient quantities before any increase is obtained from an additional quantity of one, that determines the advantageous difference to a large degree, between fallow and stubble lands. It is apparent from these considerations, that heavier dressings of superphosphate are necessary and justified on fallow land than on stubble, since the former contains much more nitrogen. The same law applies to utilisation of rainfall, for no matter how much moisture is present, if the soil is deficient in plant food, then the crop cannot utilise the moisture.

An effect of applying large quantities of fertilizers is worthy of notice here. By applying, say, ½cwt. superphosphate, half the water soluble chemicals in the soil may be absorbed by the crop producing perhaps 10 bushels per acre. The second ½cwt. of super would probably allow the remaining half of the water soluble chemicals to be absorbed, increasing the yield to 20 bushels. The third ½cwt. would then show an increase barely covering the cost of the additional manure, since there are now no water soluble fractions of the other chemicals available to the crop. The fourth ½cwt. would obviously produce little or no increase. From an experiment of this nature we conclude that for that particular soil a dressing of 1cwt. of super is the most beneficial and economical. This is the "Law of Diminishing Returns," and is of paramount importance to practical farmers, who should be able to decide which is the most beneficial dressing of fertilizer to apply, consistent with economy.

To summarise the important points of the foregoing, for high yields all necessary chemicals must be present in the soil in sufficient quantities, the amount of the most deficient limiting the yield; and there is a definite margin in applying fertilizers economically, consistent with returns.

By applying fairly large quantities of super, many farmers have succeeded in raising their average above the 8 bushel mark to the 18 bushel level, through having supplied the means of utilising more of the rainfall received. These high yields are only obtained from fallow or similar land capable of supplying sufficient nitrogen for this amount of super to be absorbed by the plant.

Since fallow contains more nitrogen than stubble, there have been placed on the market of recent years, combinations of super and sulphate of ammonia, which contain large amounts of nitrogen. These mixtures are intended to produce crop yields from stubble approximately those obtained from fallow, allowing, of course, for the difference in chemical conditions existent in these two soils. These manures are, however, not easy to apply, and unless the farmer understands his subject, will not yield the anticipated returns.

It is doubtful whether super has any effect, in these districts, upon the crops succeeding the crop with which the super was sown. This is due to the reversion of the water soluble phosphate back to insoluble phosphate, being then in a condition not capable of ready absorption by the plant in sufficient quantities to have much effect. There is an apparent effect in those paddocks left out to grass, but this, I think, can be attributed to the mechanical action of the seeding implements on the soil, since I have observed that the mere passage of the machine across the paddock produces these effects even where no super is sown. Potash is an important material, and does not receive the consideration it deserves, due, no doubt, to its prohibitive price at present. Consequently not much is known about it in these districts. Analyses of these soils have shown that there is a deficiency in this material and I have seen several patches of wheat crop, especially upon very sandy soil, that possess the red ribbed stalks and dying tips of flag, which characterise potash deficiency. There may possibly be something in this matter which limits our crops to 5 and 6 bushel averages instead of 8 bushel. During last harvest, I saw a 9 bag crop situated adjacently to a 5 bag crop, both of which experienced similar conditions approximately. The heavier crop showed marked signs of potash deficiency, whilst the lighter displayed only slight traces of deficiency. The explanation is probably that the heavier crop had reached the limit of the available potash, and the 5 bag crop not quite so, so that perhaps the lack of potash coupled with other conditions, had prevented it from increasing further. The paddock in which the former grew had a considerably greater percentage of clay, while the other was sandy.

Fallowing.

The important principle to be grasped in fallowing is that our efforts are directed largely towards the production of nitrogen compounds in the soil naturally, instead of having to apply them artificially. There are, of course, many other reasons for fallowing, not the least of them being conservation of moisture and consolidation of the seed bed. Nitrogen is a gas of the air, which cannot be absorbed by ordinary crop plants, and so it becomes necessary that there should be some scheme whereby it can be combined with other chemicals and brought into a state capable of solution in water.

It has been discovered that there are present in suitable soils, countless numbers of bacteria, capable of producing soluble nitrogen compounds suitable for plant food. These minute organisms absorb gaseous nitrogen from the air and convert it to soluble nitrogen, when supplied with certain conditions of air, warmth and moisture. These conditions can be obtained by fallowing. Moisture is provided by the rain, warmth from the sun's rays, and the chemical actions of decomposition of vegetable matter in the soil and air through the breaking up of the soil. These conditions must all be present, or the good work terminates. The necessary moisture is retained in the fallow by the practice of harrowing, and the vegetable matter is supplied by careful crop-rotations; and when crop-rotation systems are ignored, a time is reached when fallowing the soil will no longer produce any benefit, as many farmers have proved through long and dear experience.

The importance of air can be realised when a waterlogged soil is examined. In such a soil, the air has been displaced by water, and consequently, bacterial actions are greatly retarded, and also the plant roots are no longer able to breathe, so to speak. Plant life, therefore, shifts to fresh fields, and the waterlogged soil becomes nothing more than a bog. The importance of warmth to plant life is obvious, when we remember how different are the effects on growth in the winter from the warm spring.

It is essential that every drop of rain which falls upon the fallow should be conserved, not because we wish to store it solely for the use of the crop of next year, as water, as our grandfathers fondly imagined, but also for the copious production of soluble nitrogen through the encouragement of bacterial actions. That we do not require the moisture solely for water supply, will be realised when we remember that our annual growing period rains are sufficient for about 24 bushels, whether they fall on fallow or stubble.

For a farmer to have produced good fallow, he must have conserved every drop of rain, practicably, and allowed only the minimum to escape through evaporation. I have observed that it is not the fallow which is dampest at seeding time which returns the highest yield, but rather that which has been harrowed considerably, and is still dry at seeding time. In this latter fallow, the most plausible explanation is that more of the moisture has been utilised by bacteria, thus producing more plant foods. It appears as if an excessively moist fallow at seeding time must be devoid of vegetable matter, and this condition indicates a crying need for a drastic alteration in the crop-rotation system.

Moisture is retained in the soil by harrowing, and it is good practice to harrow as soon as possible after each rain. Soils which have a tendency to drift do not need harrowing to such an extent as others, since they, by their drifting character, are self-mulching, and readily loosen up without harrowing.

Ploughing in the first place should not exceed 2ins. or 3ins. in depth. Deeper ploughing than this causes no gain from the extra depth, and on the contrary, often does considerable harm. It is obvious that the roots of the crop should be in contact with as many particles of food material as possible, therefore the seed should be sown on the hard seed bed. If the ploughing is deeper than 3ins., then the seed cannot be sown on the seedbed, since the grain of wheat does not contain enough nourishment to enable the shoot to grow through more than 3ins. of soil without seriously affecting the strength and healthiness of the plant. This is so, because shoots from seeds rely entirely upon the food material within the grain for sustenance until they have produced their first green leaves above the soil surface. Since it is inadvisable to sow deeper than 2 or 3ins. at the most, then it can be easily seen that ploughing deeper than this means that there will be several inches of loose soil between the grain and the seedbed proper. Such a condition is detrimental to the wellbeing of the plant.

As we have seen the roots cannot obtain so much nourishment in a loose soil as in the harder soil, and also they have a loose anchorage in the ground. With every gust of wind the plant sways, and unless the roots are in hard soil, they will move about too. Such a condition is often seen in loosely combined crops, where the roots are quite free in the soil. With the continual movement, the roots become hardened to such an extent that they are unable to absorb nourishment further, thus retarding the growth of the plant, and in some cases, causing it to die altogether. This is the cause of much of our so called Take-all. True Take-all is undoubtedly widespread, but much of the failures alleged to be due to this disease are in reality caused by faulty soil conditions as outlined above. This is referred to as "puffiness," and is caused by ploughing and cultivating too deeply.

Whether to use a cultivator or a mouldboard for fallowing depends on the soil of the particular locality, and the ability of the respective machines to eradicate weed-growth and produce hard, even seedbeds. Personally, after having witnessed several tests and experiments on this question, I prefer the plough, but it is a question for the individual farmer to decide. The machine should be set and adjusted to produce as hard and even a seedbed as possible, practically. This remark cannot apply to particularly sandy patches, but much can still be done in the matter of producing good seedbeds, and if the advantages were more keenly realised, greater attention would be paid to this phase of fallowing. The same applies to harrowing after rain.

Rotation of Crops.

As mentioned before, repeated fallowing of a piece of ground depletes the stock of vegetable matter upon which the bacteria feed. The name given to this material is "humus." These districts are unsuited to the practice of green-manuring, and applications of suitable material such as stable manure are impracticable. It is necessary, therefore, that before fallowing, the paddock should have been under grass for one or two years. On these principles, the rotation of greatest application for these districts is pasture once or twice—fallow—wheat once or twice, with oats for preference as the second crop after fallow, if possible.

It should be endeavoured to place about half the crop on fallow each year to manage this rotation successfully. If the disease of true Take-all is present, it is advisable to sow oats as the first crop on the fallow, as this cereal is immune from attacks of the disease. In extreme cases, it may be necessary to sow oats a second time before attempting to sow wheat.

Sheep and their Value on the Farm

[E. R. Pfeiffer, O'Loughlin (Ceduna Conference).]

It has now become an indisputable fact amongst sheep breeders that the wrinkle is the cause of more than half of the blowfly trouble. Rams which become struck by the blowfly whilst in good normal health, should be got rid of or emasculated. A ram which carries a very dense fleece with plenty of yolk may also be struck, and could be exempt from the aforesaid operation. An examination of ewes which have been struck, will invariably show that the tail wrinkle is the cause. The type of Merino sheep now being bred by breeders for northern and other pastoral areas is an upstanding sheep, large frame, and free from body and tail wrinkles. By an upstanding sheep is meant one that has a fair length of leg, besides carrying a good, deep body. Such a sheep can travel fair distances with ease. It has been the practice of late years to favour a low set body. For south-eastern requirements, no doubt this class of sheep would do, but for pastoral conditions and ours, which are something similar, we need a sheep that is a good traveller, because distances to water are sometimes two and even three miles. We have no fat lamb trade, and to diverge from the Merino for these parts would be uneconomic.

For breeding, I favour the practice of securing a stud ram at from 15 guineas and upwards. To buy flock rams for the West Coast is a waste of freight charges, for quite a good class of ram can be bred from mating stud rams with say about 50 of the best ewes. Keep the little flock separate at lambing time, and mark the ram lambs. Reserve double the quantity of ram lambs required as rams, leave them untreated until it is seen how they develop, and any that lack conformation and have tail wrinkles, have them emasculated. Even in the hogget stage a few may have to be culled out on the shearing board on account of their poor type of wool. Do not use the young rams until they are about 4-tooth. Then they should do for about 2 or 3 seasons. If the stud ram is quite different in blood line or breeding from the rest of the flock, then the above practice should be quite sound without any fear of inbreeding defects; but if following the same breeder for rams, then a little more care should be taken against inbreeding; but even then, the practice is quite safe to give a trial.

Sheep have their value on the farm for the control of weeds, and Buck-bush, which has been very prevalent this year, and which has caused much extra work in its eradication for the preparation of seeding. My experience has been that a paddock to be kept clean from Buck-bush and other bushes must have sheep on it in July, fed down almost bare, and then grazed again about every 2 months.

Where two farmers have only small flocks each, it would pay them to go together with their sheep to have each other's paddocks fed off. To have a small flock in a big paddock to be fed off bare, means that the sheep must be kept in there too long, and nothing is more detrimental to sheep than to be kept in the one paddock too long.

Sheep can be used very effectively for replacing the harowing of a crop after it is up. This means that the sheep are driven over the crop after it has stooled and up to 6ins. high. They are driven by two men, preferably, in a straight direction up and down the paddock until they have trodden the whole crop as evenly as possible. By this means the soil can be packed down when it is still wet, but by using harrows, one would have to wait until the soil became reasonably friable so that it would not clog in the harrows, thus pulling up a lot of wheat.

In districts such as this, where there are frequently long dry spells, it is advisable to have the crop worked in as wet or moist a state as possible. This minimises the risk of a crop not having sufficient moisture to recover to advantage after harrowing; because by harrowing, the farmer must wait until the ground dries out sufficiently to work it, and if a dry spell is experienced afterwards, his crop may not recover to advantage.

Of course, sheep have many more well recognised advantages, such as supplying mutton for the home, and providing an income from the wool—as well as the sale of a few lambs or surplus sheep. The only real disadvantage is when one is compelled to cart water for them for long distances, and then they do not pay; but for farmers who have permanent water within a reasonable distance, they undoubtedly are always a valuable asset on the farm.

Marginal Areas

[J. W. Blumson, Laura Bay (Ceduna Conference).]

The county of Way is among several of which it is stated that they cannot be looked upon as profitable wheatgrowing propositions, and that they should revert to sheep and cattle. These statements constantly repeated have helped in depreciating the value of our holdings, so that land here has no unimproved value, and improvements are only worth a fraction of their cost.

My main consideration has been to make rough scrub land fit for cultivation, and generally it has meant a sacrifice at the expense of yield, especially since wind erosion has caused damage. Although low yields have resulted, the county compares favourably with older parts of the State, when at the same stage of development. Many of our residents came from Yorke Peninsula 35 to 40 years ago, and Yorke Peninsula would possibly have been classed as a Marginal Area at that time. Are we to conclude that agricultural science has reached its limit of use, and cannot help us? That is what is implied when this land is condemned. I do not believe it, and past history will repeat itself, and the Marginal Areas of to-day will be of value in the future.

It is suggested that the land revert to sheep and cattle, yet there are more sheep and cattle than in station days, and in station days there were no rabbits and foxes. To abandon cultivation would eventually result in less livestock. The district is subject to plagues of insects which make crop cultivation necessary to prevent the land becoming permanently bare, and pastures must be broken up to improve results. If we are to leave our holdings to sheep and cattle owners, where are we to go? It would be fitting to pension off our old pioneers, but what of their children?

About 3 years ago we experienced a rabbit plague, which came to us suddenly, and we could never have coped with it had the good rainy seasons continued, but drought and foxes have been useful, and assisted our hard work; but now conditions are getting ready for a bigger breeding area. No doubt there are men who could make use of these farm homes, but lack of business methods prevents anything being done. As we are far distant from a labour market, I do not favour the idea of larger holdings, and I consider it a working man's area, and 1,000 acres will keep him fully employed.

The average wheat yield for 38 years was 5.08 bushels per acre, so for general use, expensive harvesters and implements are not so profitable as elsewhere. I wrote of the overproduction of wheat in 1928, when wheat was 5s. a bushel, and I now consider it advisable to keep our lands closely settled if possible, but not in an extravagant manner. We have experienced 5 years, during which the wheat growers of the world have had help in many different ways, which has encouraged production, including fixed prices, acreage and bushel bounties, yet we have only produced enough for world requirements.

During the last 7 years the average useful April to November rains have been only 817 points, compared with the previous 14 years of 950 points, an average shortage of 141 points. In addition to this dryness, wind erosion has been responsible for considerable crop losses and grubs destroyed portion of some crops. When we had good rains, red rust reduced the yield, and another year hail storms did damage. The following year mice spoilt a lot of the seed wheat in the ground; then we had a plague of rabbits, which damaged grown wheat and afterwards took a lot of the next season's wheat before they could be destroyed. A plague of foxes helped to destroy the rabbits. Last year we had only 627 points of useful rain, and then a plague of grasshoppers destroyed feed and crops and apparently poisoned the leavings, causing our sheep to die. Is it any wonder that our yields have been small during these years?

We have experienced a similar term of years when there was none of the damage done to crops that was experienced during the last 7 years. The average annual rainfall experienced at a farm at Smoky Bay ten miles away, for 11 years to 1914, was totalled at 1,349 points; useful rain 1,089 points—272 points more than the last 7 years here. Surely we may hope that the dry period has nearly ended, and that the rainfall will improve. If so, it should be an encouragement for some suitable persons to settle on the abandoned farms.

It may come as a surprise to some people to know that for a period of 5 years ending 1893, the everage wheat yield of South Australia was 6.36 bushels per acre, and that during the same period, the yield in the Northern District outside Goyder's Line was 7.60 bushels per acre. Until recently the slogan of our Agricultural Department has been "Bare Fallow." As regards our poorer rainfall areas, I have become convinced that it would be a better plan to keep our land well covered and protected by vegetation, but this subject could be dealt with separately.

Rope Making from Waste Binder Twine

[J. S. Hill, Wilmington (Eurelia Conference).]

All farms have a quantity of waste binder twine about the place. This can be used up by making it into rope. Three persons are required to do this, not necessarily all men, children can turn the machines.

The machines are very easily made in two parts. Part 1 has 3 hoops with handles attached; also 2 slabs are needed, about 3ft. 6in. long, 9in. wide and 1½in. thick. The bottom slab has 2 small truck wheels and an axle bolted under the front of the slab. The upright piece should be bolted on to the lower slab a foot from the front end at right angles. Near the top of this piece, 3 hoops are placed in the form of a triangle, 6in. apart. A hoop is bolted to the rear end of the lower slab to enable a heavy weight to be attached to it.

Part Two.—The lower slab is 3ft. 6in. long, 9in. wide, and 1½in. thick. The upright piece is 3ft. 6in. high, 6in. wide, 1½in. thick and has 1 hook with handle attached in the centre near the top. This part has no wheels. This piece also has a hook bolted to the rear of the lower slab to allow it to be secured to a post. The first thing is to cut the bands of the sheaves close to the knot, so as to get as long a twine as possible; then put these away in a clean dry place.

When starting to make a rope, cut the knots off the binder twine; then place the machines facing each other a little farther apart than the length of the rope you intend to make, to allow taking up as the rope is being made. Start to make the strands at No. 1 machine. Take half the number of strings you intend to put in the strand, and double them over the lower hook, seeing that all ends are at uneven lengths, so that the splicing will come even all along the strand. Then with one person turning the handle to the right and another holding the end of the strand until you come to the first end, splice in a piece of twine by giving it an inch lap and twisting the two ends together. Continue turning and splicing in this way until you have the strand long enough to tie to the other machine; then make the other two strands likewise

Place a round piece of board with 3 holes in it to fit No. 1 machine on the handles, and turn the 3 strands at once until all are of the same tension. A piece of board with 3 notches in it is placed between the strands to keep them from tangling around each other, also place a small fork at No. 2 machine end, 1 strand in the middle of the fork and 1 on either side.

With one person standing on each machine and both turning at the same time - No. 1 turning forward and No. 2 turning backward—the third person holding the fork gradually lets it work along until he reaches the No. 1 machine. The rope is then taken off the hook and the knots tied. Any projecting ends of twine must be cut or singed off. The rope should be greased with mutton fat to soften it and to keep out the weather.

The Child, the School, and the World

[F. H. Stainer, Eurelia (Eurelia Conference).]

Whilst such a discussion as this may not actually be classed as an agricultural topic, it has been selected in the hope that it may serve to enlighten the minds of some present as to some of the recent developments in educational practices. It may also interest some to hear a different viewpoint from their own. It is proposed to limit the paper to two chief sub-headings—"The Modern Idea of Freedom in the Schools," and "Movement Outside the Set Curriculum."

Enlarging upon the first section, education, in common with most things, has undergone a transformation since the Great War. From the days when reading, writing, spelling, and arithmetic were the compulsory subjects, the modern idea has been greatly modified. In those by-gone days the teacher would say, "Listen and do as I tell you;" now the children are encouraged to do something for themselves, as they must do in after life.

A visit to the kindergarten classrooms of a big school would amaze the uninitiated, who probably would be unable to see any point in the apparent play of the little ones in school, whereas they are learning more in less time than ever before and liking it, too.

The Small Country School.

The idea of having the children "do" something for themselves, is found here in a more restricted form; nevertheless, it is there. We try to have the children realise that school is an integral part of their lives, not one stage to be cast off and forgotten at 14, like a transition from one form to another in the life-cycle of an insect. Sums are now provided such as they will be called upon to do in the course of their own business later on, or as will teach them to bring reason to bear to solve the problem. The old type of history and geography was often criticised. New courses have been framed to teach the boys and girls to understand the ways of the world and its people—"human" studies. Two ideas, "Why is this?" and "compare it with something you know," replace the old learning by heart. It does not matter how many inlets there are on the coast of Argentine: the important thing is the use to which they are put, and why Australia does not do the same. The child finds a solution from his own study or experience. Nature study, handwork in various forms, observation lessons and other kindred subjects link the inside of the school with the outside world.

Nowadays, the scope of activities outside the curriculum is growing, and their value is becoming more generally recognised. School concerts, exhibitions, visiting days, picnics, Red Cross movements, &c., bring home to the child's mind that the teacher is not the only one who cares, and school extends beyond the hours of 9 till 4. The school is not confined to the limits of the one building.

Public meetings, mock parliaments, lectures and plays, conduct the child into channels which lead right through life. While this sort of thing is becoming more important, less stress is being laid on the result of actual examination. The child who receives 100 per cent. in the examination does not always make the best citizen in later years.

Some parents are anxious to see their children advance, and towards this end assist them with their studies at home. To these parents allow me to offer a word of advice. Do not help the child by telling him the figures to write down in working a hard sum, as this form of assistance teaches him nothing, and the result is that Tommy passes in father's homework next morning. Imagine the loss of faith in dad's ability should the sum be wrong. Instead of working anything out, make some suggestion which will point the way to a solution. In place of an awkward-looking set of figures, place simple numbers, and work this lot out with the boy. Should he possess average mentality, he will realise that the same steps must apply in the harder sum. Try to lead the child along the right track —not push him along it.

The Farmer of the Future

[W. B. Koch, Wepowie (Eurelia Conference).]

South Australia being mainly devoted to primary production, the statement is frequently made that "The farmer is the backbone of the country," and concern is shown at the desire of men and women to leave the land for the comforts and privileges of cities.

Compare circumstances and existence under each heading—city *versus* country. City folk have education, regular hours, home conveniences, social, religious and sporting advantages, and at least a living wage equivalent to the amount of work done. Compare this with the country—

isolation, educational limits, burden of debt, hours of work extending from daylight to dark, lack of home conveniences and necessities, and a limited outlook.

The question may be asked, "Why do men stay on the land when their lot is so hard, and why is it that some people on the land seem to know nothing of hardship and the disadvantages stated above? The country is not concerned about these types of people, for some have inherited properties free from encumbrance, or have secured a cheap property and have had good seasons; or have selected land years ago and have been rewarded by thrift. Others remain on the land because it is part of them or seems to be in their blood and so they struggle on against adverse circumstances, environment and conditions, hoping that their children may have it easier. To-day the majority are in these circumstances, and their children are the ones who are going to be the farmers of the future, if we can hold them; and how to do it is our present problem.

What has brought about this condition?—Bad seasons, low prices, interest and high production costs. Many a good farmer has been spoiled in the past with the advent of the acreage bounty. This has lead the farmer to increase his wheat acreage and also to increase his stock and plant, with the result that overhead expenses become so heavy that he has found himself at a loss. The fact that 40 per cent. of the State's wheat crops are not sown on well worked, clean fallow, proves the above statement to be only too true. Those in authority have been just as much to blame; it is either grow more wheat, keep more sheep, profit in cows, or feed corn to pigs and poultry, until the farmer changes from one to the other, paying high prices, and just being established in one branch when it is becoming glutted.

Very often the press booms someone who is doing well at some particular sideline, and says that the farmer could not make it pay if he had to pay wages to employed labour, but his family do the work and show a profit.

The Farmer's Sons and Daughters.

Any son or daughter on the farm is worth more than any hired servant. Why will not the boys stay on the farm? Because they work for nothing until they want to get married, and then try and start on their own with a young wife and growing family. All they know is how to work—nothing of the expense and management of a property, because father has done all that.

Consider this question with a balanced mind, and it will be seen how serious the position is, and how vital it is to the maintaining of our status as citizens of equal rights with those under other circumstances. The farmer's son attends the local country public school, and at the age of 14 is ready to leave, and at the same time the parent would like to give him extra education, but cannot afford it because the son can drive the team and save a man's wages and keep. He will prove the best man that ever worked for the farmer, and if helped and given hints, will be a better man than his father. When all is said and done, that is what a parent wants his son to be—the best farmer in the district.

Now consider his education to attain this end. The boy after leaving school is bound to become very keen on his job, and may become so engrossed in his work that he is liable to lack doing anything to keep his mind fresh and go on learning from where and what he had learned at school. These boys are to be the farmers of the future, and it is up to the parents to do all in their power to enable their sons to be on an equal footing with their city cousins.

The first thing to do is to buy him a diary and see that he writes it up every night. If you have never kept one you will become enthusiastic about it and its records, and so will your son. It will be an eye opener as to how long it takes to do a certain paddock, how it is worked, what wheat is sown and the time the season broke. By doing this he will gradually increase his education. Let him keep accounts of the farm expenses in general, and both you and the boy will know the wheat in the bag is not all profit, as people are so often apt to pass judgment. It may be said that this is not necessary on a farm, but it definitely is. A city lad is trained in all departments before he is started in his own business, and he gets all he earns. The farmer of the future will have to be treated the same if he is expected to stay on the land. If records were kept farmers would not suffer from land booms, as in the past.

Circumstances have changed, and so will the application have to alter if the farmer of the future is going to be competent and satisfied; for he must be trained in his business and be able to conduct that business, and in co-operation be able to maintain that freedom of action, spirit and application so necessary to a contented and successful rural population. And not until we see that our sons and daughters are better educated and catered for are we going to get the rights due to the farmers, their wives and children. Nor will success be reached with land settlement. Instil into the mind of the farmer of the future that he is engaged in an honourable business, and let him develop the feeling that he must be educated and equipped to develop that farm more than ever, because it has been in the family name for so many generations.

The Sheep Blowfly

[F. K. Parsons, Kelly (Kimba Conference).]

The flies that are responsible for striking sheep are not native to Australia, but were imported accidentally during early settlement.

A fly passes through four stages—egg, larvae, pupa, and adult. Approximately 1,000 eggs will be laid by a female fly. These hatch out in 1 or 2 days. Certain species do not lay eggs, but deposit young active maggots.

The blowfly larva or maggots exist in two distinct kinds—smooth maggots and hairy maggots. These two types are important, because they form a valuable means of controlling the pest. The smooth maggots belong to a primary species of fly and the hairy to a secondary species. The head of the smooth maggot has a mouth on the underside of the head, and jaws can be extruded in the form of two parallel block hooks. These serve to tear food into small pieces; actual feeding is chiefly done by eating liquefied food. The hairy maggots have a more superior method of progression and mouth hooks are pointed and stronger formed than smooth maggots.

Experiments conducted at Canberra have proved that the maggots of the primary fly are first deposited on the sheep or carrion. The secondary fly will not lay eggs unless the sheep has been already struck with the primary fly. The hairy maggot is a natural enemy of the smooth maggot, and when full-grown will attack and eat it, thus diminishing flies capable of striking sheep.

However, the sheep is worse off than before, because hairy maggots are much more active and will burrow far deeper into the body of the host. In summer, the period from egg to adult may be as short as 10 days.

The fly may be divided into two classes—those that strike first, called primary flies, and those that do not strike until after the sheep has been struck, secondary flies. In the first division are the primary green blowfly, the large brown blowfly, and the Western Australian brown blowfly.

In the secondary division the most important is the secondary green blowfly, distinguished from the primary green fly by dark bands crossing the abdomen. Primary flies fly about 8 miles in 17 days, while secondary flies fly 10 miles in 12 days. The life of a fly is from 35 to 91 days.

Methods of Control.

Practical control may be divided into two divisions—the prevention of strike, and cure of sheep once struck. The prevention of strike can be helped by decreasing the number of flies. As maggots can obtain full development only by feeding on carrion and living animals, it follows that all carcasses should be burnt. If buried, the hole should be deeper than 6ft., because primary maggots have been known to reach the surface from this depth.

Crutching has proved its value many times over. The reason for this can be seen when it is realised that the strongest sense the blowfly possesses is that of smell. Under favourable conditions, the Council for Scientific and Industrial Research has shown that the blowfly will deposit eggs on saddle cloths and blankets. Jetting and dipping in certain instances have been most beneficial.

By far the best method to prevent fly attack is to breed sheep that are not susceptible. It has been proved at Canberra that flies do not strike sheep at random, but because of the development on the sheep of an area of susceptibility, that liability to strike is fundamentally dependent upon some factor in the sheep itself. In New South Wales careful records were keep of sheep struck and it was found that practically the same sheep were struck each season. After examining the conformation of these sheep, it was found that the liability to strike was parallel to the degree of wrinkling around the crutch. Thus, sheep having wrinkles around the crutch should be avoided as much as possible.

Some figures published in New South Wales on a private property are interesting. A flock of 2,400 ewes was divided into three and classified as follows:—Flock A (relatively insusceptible), 1,100; flock B (moderately susceptible), 870; flock C (definitely susceptible), 459. The number of sheep struck in each flock was: Flock A 1 sheep in 21; flock B. 1 sheep in 6; flock C, 1 sheep in 2. Some sheep in C were struck as many as 20 times in one season.

The infolds of these wrinkles are essentially places wherein moisture from urine, sweat, and rain is retained. Bacterial decomposition of yolk, sweat and skin exudations are thereby favoured, and bacteria growing on such areas may cause a definite inflamatory condition of the skin. Such areas give off a smell which is naturally attractive to the blowflies. Sheep which are narrow behind and have their hocks approaching each other are more prone to be struck than are wide, open-hocked sheep.

Wool condition is also related to some extent, for, in general, the wool of susceptible sheep carries more condition. It might be thought that the wool would suffer if sheep were bred that are "fly proof" but the A division in the example given contained a larger percentage of top line wool than the others. The "susceptible" group's wool tended to be finer and more heavily conditioned, yet the wool of this type is carried by a fair percentage of sheep which are not struck.

Local Experiences.

With our flock with lambs by a Merino ram, we had to get them in practically every day during October, 1931. After introducing Corriedale rams and crutching in February, we had only about 6 cases since the 1933 shearing. The top of the ear of nearly every ewe that is struck is nipped off, and it is usually these sheep that are most troublesome. When fit, they are killed for rations.

The mating of A class rams with A class ewes, from the divisions in the table, gave lambs that were much less susceptible to flies than lambs from either of the other divisions. The question might be asked if susceptible sheep are bred out of the flock will not the fly strike the less susceptible ones? The answer, according to New South Wales experts is that certain conditions appear to be necessary for the development of maggots on sheep, and it is the presence or absence of these conditions which seem to determine whether fly strike will take place. These conditions are a factor of the individual sheep, and are not influenced by the fact that other sheep are running with it.

Keeping sheep yarded unnecesarily is to be avoided. Adequate water supplies should be available so that sheep do not have to wait about for a drink, and also plenty of shade provided, so that sheep do not crowd together.

Treatment of Struck Sheep.

A sheep that has been struck can be detected by any of the following points:—Sheep wagging tail and stamping hind feet, or bending head round and biting at flanks. Fly blown sheep generally walk at the end of the mob.

When caught the wool should be shorn well away from the affected area, and as close as possible to the skin. All maggots should be scratched out, care being taken that they do not fall on any other part of the sheep.

The best and cheapest dressing for this district is sump oil and powdered sheep dip, although sump oil is not the best for wool.

The maggots can take their food only in a liquid form so that as the sheep dip remains on the wool for a long time, any future maggots stand a fair chance of being poisoned. The sump oil acts as a protective coating on the wound and counteracts the caustic action of the sheep dip.

The dressings recommended by the Council for Scientific and Industrial Research are: (1) 5ozs. solution of Zinc Sulphate, (2) 5ozs. solution of Mamol, (3) 4ozs. Phenol in Whale-oil.

If plain bodied sheep are kept and crutched during summer, very little trouble should be experienced in this district.

Gardening in the Mallee

[H SANDERS, Nunkeri (Karoonda Conference.]

Practically all vegetables do well in this district if care is taken in planting. The only vegetable that does not thrive on bore water is the French bean, and though a certain amount of success may be achieved with certain strains, generally speaking, they do not give satisfactory crops.

Although the site of the garden in most cases must be governed by the situation of the homestead, in the case of the vegetable garden, it is not so important to choose a natural breakwind as is the case of a fruit garden. The site for the homestead should be one where a ridge or hill will break the force of south-west and north winds, and if this is done, it will save much trouble in providing a breakwind, which is essential if success is to be achieved. The ideal position for the garden is a hollow flanked by a ridge to the north and the west. Leave all natural timber on these situations until such time as something more suitable can be planted. Plough as deeply as possible, and work in a fair dressing of stable manure. Make it a rule to manure a little and often, rather than a lot at once.

Winter Vegetables.

Cabbages, cauliflowers, lettuce, &c., all do well if planted in autumn with a fair dressing of manure and if they are well watered until the first rains come. All root crops should be grown on land that has been heavily manured for a previous crop, and without any fresh manure. A dressing of super or bone super always does good, and sulphate of ammonia can be used for forcing the crops along. Peas and onions do best if planted in selected ground on well worked fallow and manured with super.

Bore water carries a percentage of magnesium salts, and in time the ground becomes impregnated with salts and it is desirable to change the ground or make provision to do so when laying out the garden.

Fruit Trees.

Although a vegetable garden may be more profitable, there is no doubt that fruit trees, if successfully grown, give a greater satisfaction and fruit ripened on the tree and picked in the cool of the morning is infinitely better than fruit bought in the shops. A great deal of pleasure and profit can be derived from a patch of fruit trees, and although in years of low rainfall, low prices for produce and relatively high costs, these things seemed hardly worth while, now that prospects appear to point to better seasons, gardening seems worth while, and more interest is being taken in fruit trees and vines.

Practically all stone and pip fruits do fairly well with the exception of plums. Citrus trees require water in summer, and as bore water is unsuitable, only plant as many of these as can be supplied with rainwater.

All other trees will do without irrigation provided that shelter and thorough cultivation are given, and a suitable mulch provided in summer. Plough as deeply as possible, and dig the holes 3ft. square and 18in. deep. When planting the tree, first fill in the good top soil, to which a little well-rotted manure from the cowyard has been added. Plant the trees 16ft. to 20ft. square.

Suitable Varieties for the District.

Almonds.—Brandis: Upright grower, good nuts, fair cropper. Chellaston: Good almond, not as nice a tree as Brandis. IXL: A good cropper, white almond, fairly upright growth, very hardy.

Apples.—Emperor (cooking), London Pippin, Granny Smith, Jonathan, Glengyle Red, Rokewood.

Pears.—Beurre Bose, Duchess, Josephine, L'Inconnue.

Apricots.—Newcastle, Oullin's Early, Moorpark, Riverside, Kingston Royal.

Figs.—White and Black Ischia, White Adriatic.

Plums.—Santa Rosa, Satsuma, Burbank, Orleans, Golden Drop, Diamond.

Nectarines.—Early Rivers, Goldmine, Newboy, Lippiatts.

Peaches.—Anzac, Duchess, Cornwall, Triumph, Elberta, Mountain Rose, Wiggins.

Quinces.—Mammoth Smyrna, Pineapple.

Vines.—Black Hamburg, Doradilla, Malaga, Muscatel, Sweetwater, Wortley Hall, and Zante Currant.

These are early, medium and late varieties, hardy sorts, and good croppers. Some of the choice varieties, which require rather more skill in pruning and treatment than the average farmer can give them, have been omitted. Obtain trees from a reliable nursery, cut the tops hard back, but only take off any damaged roots. Plant just a little deeper than they were in the nursery. If one has the time and understands the work, the best way is to plant kernels where the tree is to be, and bud them over when old enough. Trees established in this way have a deep tap root, and will live longer than those transplanted in the ordinary way.

The Farm Flock and Shearing

[WREFORD R. TRESTRAIL, Coomandook (Karoonda Conference).]

Farmers throughout the Murray Mallee are beginning to realise that sheep are not a mere side line. Sheep are one of the best means of keeping the fallows clean. They pack the soil and add nitrogen as the result of their droppings.

If purchasing sheep, procure them from a district that is on an equal with your own as regards feed and rainfall. Hills and south-eastern sheep do not do so well as those from the north. Do not overstock. Far better to have a small flock of reasonably good sheep, healthy and well fed than a big flock of semi-starved sheep. If possible, have the farm divided into several sheep-proof paddocks, and change them around every few days—this according to the size of the paddock and flock. This is better for the sheep and the grass. The sheep do better than continually grazing over the same feed. They should be provided with a salt lick at all times. There are several good licks on the market to mix with salt, or the following can be mixed on the farm:—20lbs. ground phosphate rock, 6lbs. coarse Epsom salts, 2½lbs. Sulphate of Iron, 1½lbs. sulphur, 170lbs. salt—the whole to make 200lbs. of lick. Dissolve the Sulphate of Iron in water and mix on a board all the ingredients thoroughly. One of the most important items dealing with the farm flock is that of shearing. In many cases this is a makeshift sort of affair, chiefly because of financial disability. However, certain principles must be observed if the best results are to be obtained—that is economy in handling the sheep as a matter of time, convenience, and cleanliness.

Many farmers have not a separate shearing shed, and have to use stables or other sheds for shearing, but whatever is used, make sure that it is clean. All chaff, straw and rubbish should be removed so that it will not mix with the wool. For a small flock, a shearing board 8ft. x 8ft. will accommodate two blade shearers, and a grating 8ft. x 8ft. will accommodate 25-30 sheep. The grating can be made from 2in. x 1in. timber placed from ½in. to ¾in. apart. A wool table 8ft. x 4ft. made from ¾ rounds will serve as a wool table, or failing that, wire netting will do in an emergency. The wool packs can be hung from rafters with a piece of fencing wire at the four corners with the pack a few inches off the ground. If the bales are carefully trodden, a very neat bale of wool will result. This practice is quite common in the Coomandook district and the sheep should, if possible, be drafted before shearing, so that the wool will be easier to class. Do the cross-breds first, then the ordinary Merinos, and finally the lambs.

Then comes the shearing: keep the sheep dry and right up to the shearers. Let there be as little handling as possible. Have a pen the other side of the board where sheep can be branded and then turned out. Mark any that are to be culled with some crayon and brand with any figure from 2 to 9. These can be placed on the sheep anywhere according to the fancy of the owner. The hoofs should be trimmed if grown long and deformed. Also look for ingrown horns. If the sheep are at all dirty or daggy, they should be cleaned up before actual shearing starts.

Classing.

In wool classing, the general rule is the larger the flock the better and more classes of wool can be made. For the ordinary farmer, the best fleeces are "A". Short fleeces must be on their own. On no account should the long and short wool be placed together. Any yellow or dingy wool should be kept separate, bellies by themselves, and pieces in two classes; first and stained. Skirting need not be heavy. If a lot of clover burr is in the wool, it cannot all be removed by skirting. Take out the back of the fleece if dirty and keep it separate. The bales should be branded neatly with the name or initials of the producer, place where grown, class of wool in bale, and number of bale. That is all that is needed. Two and a half inch stencils can be cut out of a piece of galvanised iron with a small chisel, and will be found very convenient. Keep the wool dry and despatch to the brokers as soon as convenient.

Marketing Farmers' Produce

[H. M. MacKenzie, Yurgo (Karoonda Conference).]

Five or six years ago at this District Conference delegates were busy looking for the "nigger in the wood pile," and the Government subsidised industries, &c., were blamed for the farmers' predicament. Wheat growers are entering on their fourth year of bounties and their second year of bounties for not growing wheat, and these bounties are being raised at the expense of the rest of the community, which brings us to the conclusion that the farmers are no longer carrying the country on their backs. Not that they have failed to produce the necessary goods, but rather because of a failure to dispose of the same goods at a profit; this because of the fact that Europe is learning to produce it's own foodstuffs, and also because Canada, Russia, America and the Argentine can swamp markets at a low price that Australia cannot hope to compete with.

From being one of the principal wheat growing countries, Australia has dropped to about 12th position with an average of 11.6bush. per acre. Nor will the quality of Australia's wheat be an asset much longer, for all countries are now concentrating on quality as well as quantity, particularly Russia, where it is now an offence to sow seed that has not been approved of by their experts. Of the 12 principal countries in Europe which used to import wheat, only Norway is importing to-day. The remainder are maintaining themselves, and in many cases have wheat for export, Denmark having the highest wheat-growing average in the world—42 bush. to the acre. The Italian Minister of Agriculture claims to have grown on chosen land, 122bush. per acre.

In spite or rapidly declining markets, the Prime Minister, in a recent speech, mooted a re-commencement of organised migration with a policy of land settlement schemes, with the idea that raw inexperienced men will succeed where our own producers with their knowledge and experience have failed.

There are gluts of nearly every variety of primary products, and prices are down to bedrock, and only an elaborate system of stay-orders, moratoria, debt adjustments, subsidies and bounties, are keeping producers from financial collapse. To settle immigrants on land would, at best, increase these gluts and help clutter an already exhausted market The cry "go on the land, young man" coming at a time when experienced farmers are unable to make a living is humbug. Wool producers are, and have been for years, working at a loss. According to the Commonwealth Year Book, wool exports to the following three countries have declined:—

	1932-33.	1933-34.	1934-35.
France ..	122,536,429	65,017,856	75,760,166
Germany ..	111,763,527	113,529,765	27,220,923
Italy	63,099,517	58,549,566	17,694,730

Australia's total wool exports have dwindled in value as under:—

£	£
1933-34, 57 million	1934-35, 39 million.

For the last 6 years the average market price of greasy wool—with the exception of 1933-34—failed to return to the wool grower his cost of production. The increase in wool prices for 1933-34 was the result of heavy buying by Japan, who put her army into woollen uniforms. Over 90 per cent. of the Australian clip depends for its price and sale on the purchasing ability of overseas consumers. Last year rayon alone replaced an equivalent of 5,302,000 bales of wool. Wolstra and other substitutes are being improved and marketed in large quantities in Germany, Britain, Italy and elsewhere. It is becoming clear to wool growers and to other primary producers that nothing of a practical value is being done to correct the position.

Britain's primary producers are fighting to retain part at leat of British home markets, and Britain must in self-preservation place restrictions on Australia's exports to Britain. Lastly, there is the myth of Eastern markets. These hundreds of millions of the Orient have to exist on a living standard that amounts to a few pence per week, and outside resident Europeans, there are no open markets in the East. New markets are not to be found, and the only markets that can be hoped for, for our primary produce, are those from which someone else can be pushed out, and this latter cannot be done easily.

The present tariff not only makes it impossible to secure markets, but there is a danger of losing present markets. It is true that Australian wheat prices have jumped in the last day or two, but it can only be looked on as temporary, for Argentine will undoubtedly bring prices down again when Australia has wheat to sell.

What then is the solution? We must stimulate the home-market. With over 50 per cent. of the population living on or below the breadline, there is room for vast improvements in home markets. Our population could, given a reasonable standard of living, consume the whole of Australia's products—with the exception of wheat and wool, and could make such inroads into those two commodities, that the marketing of the remainder would be much simplified.

Sheep

[A. Hood, Wynarka (Karoonda Conference).]

All farms should have a flock of sheep, no matter how small. No farmer should have to buy butcher's meat. Buy some fairly good ewes and then mate them with a good ram. It is a mistake to buy a good ram to mate with poor quality ewes.

Crutch all ewes about 3 weeks before lambing. Care should be taken not to knock the ewes about. When crutching, they should be separated from all other sheep and kept in a paddock by themselves. If other sheep are allowed in the same paddock, they wander about too much, and often a ewe with a small lamb will follow, with the result that she loses her lamb. Lambs should be tailed when about 6 weeks old. Care should be taken when tailing to drop the lambs into a clean yard. Leave the tails 2 to 2½in. in length, this prevents the flies striking and going up over the back—this does not apply to export lambs.

Drenching.

All lambs should be drenched for worms. This should start about the time that lambs have to go on dry feed, and should be continued at least once a month during summer. There are quite a number of drenches on the market, which are equally effective if used early and often enough. Licks also should be provided at all watering places.

Overstocking is a very important point with keeping sheep. Two hundred sheep well kept will give more wool than 300 sheep half-starved, and with less trouble. The number of sheep a farm will carry depends on the amount of feed one is prepared to sow. It is a good plan to burn off the stubble and drill in early oats early in the season. Care should be taken not to put the sheep on the oats before the crop gets a good start.

Both fat lambs and wool are a good proposition, but if one breeds his own sheep and sells wethers, culls, and cast-for-age ewes, it is about equal to selling fat lambs.

Breeding Percheron Horses

[W. J. Morcom, Lameroo (Karoonda Conference).]

The success of every farmer's operations depends entirely upon the power which he has to enable him to carry on those operations, and there is no better power to the Mallee farmer than a good, strong team of horses. The farmer has to make up his mind which is the best type of horse suitable for the conditions under which it has to live and work. Of course, every farmer has his own particular fancy, but I have no hesitation in saying that the half-bred Percheron horse is a most suitable animal to work and live under Mallee conditions. This has been my experience and also the experience of every farmer who belongs to the Lameroo Horse Breeding Society. The half-bred Percheron is a horse that is a quick grower, a wonderful doer—given any chance at all—with good solid feet, good bone and plenty of muscle. He stands wide between the legs, with wide face and a clear eye, is very active and as docile as it is possible to get a horse, and yet with plenty of life and stamina that can stand up to hard work. At 2 years old the colt can be broken in when the fallows are being worked, and then by harvest time—if care is exercised—he will do his share of work, also help to cart the wheat, and then, if he has a few weeks spell, he will be ready for seeding time and take his place in the team the same as any other horse.

The Percheron at Lameroo.

In August, 1928, I wrote a paper for a Bureau Conference at Pinnaroo on "Horse Breeding," at a time when mechanical farming had caused horse breeding to be almost at a standstill. That paper appeared in a Stock Journal, with the result that Mr. Melrose of Mintaro offered to lease me a Percheron stallion. I consulted with my neighbours, and within a fortnight we had formed ourselves into a society and had the horse in our district. We were subject to a lot of severe criticism, but those farmers who spoke against the horse are loud in its praise to-day. To anyone desirous of knowing the working of our Horse Breeding Society, I will be only too pleased to give the fullest information, or if anyone (or company of farmers) cares to visit Lameroo, they will be shown what the Society has done. In a farming community such as the Murray Mallee, of which we all form a part, if one section of the community has found something that is a benefit, they should endeavour to pass it on, because that is the aim of the Agricultural Bureau.

It is eight years since the Percheron was introduced into Lameroo, and I am quite confident in saying that there are at the moment at least £2,000 worth of half-bred Percherons belonging to our Society. That is a distinct asset to any district.

Pear Tree Pruning

[A. FISHER, Pinnaroo (Pinnaroo Conference).]

Broad Base Desirable.

Probably one of the most common faults met with in orchards of well established pear trees is the narrowness of the trees immediately above the crown. Too long pruning during the first and second years and insufficient attention to means for broadening out the basal growth usually results in the formation of a far too narrow type of tree.

If the straight rods so often received from the nursery are topped about knee-high or about 18in. from the ground, the opportunity is provided by subsequent hard cutting to develop a fairly broad base. Width just above the crown is desirable, so that the main branches can be carried upward in a manner which will result in the formation of a moderately open tree. Such a type supplies ample room for the later development of spur clusters along the main arms, both inside and outside the tree. Consequently, as the lighter laterals are shortened back after maturing their fruit buds and the spurs are produced, the weight of the crop is developed where it will impose less strain on the branches.

This, of course, necessitates the encouragement of a sturdy framework growing well outward and upward. There is, perhaps, a greater tendency for the growth from the top buds of a shortened branch to push upward than with the majority of fruit trees, and unless means are taken during the early years of tree formation to counteract this, somewhat narrow trees are bound to result.

Nevetheless by the systematic adoption of the practice of cutting back each season, so as to turn the outward laterals to take the place of the leading shoots, a fairly well-spaced tree will usually result.

The practice referred to is generally applicable to the pruning of most varieties of pears during the early two or three seasons of growth. It will be noticed on the growth of most trees that when a leader is shortened, the ensuing extension from the uppermost bud retained is decidedly more upright than is the growth from the buds immediately below. This occurs irrespective of the position of the buds, whether they are situated on the inside or outside of the tree. This is apart from the natural predilection of growth to turn to the light. Assuming that a straight rod has been topped about 15in. or 18in. from the ground, the growth from the three uppermost buds, and possibly from a fourth, will supply the initial framework of the tree. These buds are situated spirally round the stem or trunk, and they will provide the main arms which constitute the crown of the tree. Consequently they require to be set in stoutly. By cutting them back hard, they will thicken up and provide a strong foundation for the main branches.

Early Pruning.

The retention of only a few buds on an upward piece of the previous season's growth is followed by a greater vigour in the subsequent extensions from the buds. Thus if only about half a dozen buds are retained, the growth from these will be considerably stronger than when lengths containing double the number of buds left. The second fact that is of particular value during this stage of a tree's growth is that the uppermost bud will produce the most vertical growth. That from the bud immediately below will swing out at a wider angle. Consequently, if this second growth is availed of to form the leader, the base of the crown may be widened. Thus, if advantage is to be taken of this natural habit of growth, the three or four growths forming the crown should be shortened into buds immediately above others situated on the outside of the branches or main arms. These are allowed to grow unhindered during the season following pruning, but at the next season's pruning the uppermost shoots are cut out, so as to leave the extensions from the second and outward buds as the new leaders. These in turn are similarly shortened in, so as to again derive the advantage of the wider angle of growth from the buds in the outer positions. Thus the first year's pruning will result in the retention of about 6in. of growth, and at the second season's pruning, 8 or 9in. of leader extension may be retained.

It is seldom necessary to continue this practice of selecting the leader from the under outward bud extension beyond the fourth season, for by this time, a nice open base about the crown of the tree will have been developed. The continuance of the leaders may thereafter be in a gradual outward and upward direction, the length of growth retained on each leader being determined by its general vigour. At some time suitably spaced side laterals may be selected to provide the secondary arms, thus steadily increasing the number of leaders. This method of increase may be continued until a dozen or more well-spaced leaders have been obtained. From these, light laterals may be retained uncut to assist with the natural spur development in furnishing the branches with an adequate supply of fruiting wood.

Extension of Leaders.

After each season's pruning, when once the desired number of leaders has been obtained, there should remain only one extension from each of these main branches. Strong-growing upright laterals situated immediately below the one selected for the extension should be cut right out. Usually the one retained should be topped, though when a tree is somewhat slow in building up its spur development, they may be allowed to remain uncut for a season. This temporary check to the sap flow will frequently have the effect of assisting the formation of spurs. It is only occasionally that the adoption of this course is desirable, for if the annual extension of the leaders has not been unduly long spur and light lateral development will take place. It is only during the first three or four years that these strong growing laterals are required. They are then used to multiply the leaders until the desired number has been obtained, and from that time onward they should be treated as leaders, pruning them to single terminal growths as they are extended each season. It is mainly about the middle and lower portions of a tree that growth is wanted. In these positions it may be used to encourage the fruiting habit. When, however, a few upright laterals are allowed to remain near the top of the tree, they merely become competitors with the leaders, and in place of a single extension to draw the sap flow, the plant food required to nourish and extend these growths must be drawn from below; and consequently the more horizontal laterals and spurs suffer as a result of the sap required by the unproductive growth about the top of the tree. Whereas the effect of a single leading growth is to check and regulate the supply of sap so that a reasonable share becomes available for building up the fruiting parts. Several terminals at the top of the leader make use of the sap and so deprive other more valuable parts of the tree from obtaining their due share. Later there is a tendency toward partial barrenness in the lower portions, and to overcome this, it is often necessary to cut back hard, and so turn and check the sap flow.

Spurs and Laterals.

While most varieties of pear trees will furnish up spurs naturally from direct off the main branches, laterals may frequently be used to increase the fruiting surface of the tree. Any such spur formation should be maintained as near to the main branches as possible, for the greater the distance that a spur cluster is from its source of food supply, the weaker will be the buds and the poorer the class of fruit produced. Horizontal or flat-laying laterals are most suitable for increasing the number of spur growths. These may be shortened, and later the growth may be turned into a weaker extension which will usually cause spurs to develop between it and the main branch. When once clothed with spurs, these growths may gradually be shortened back. The retention of moderately strong laterals, which later may be shortened in, is often of assistance in causing the tree to bear. Since cutting promotes growth such laterals as are retained temporarily are better allowed to remain uncut until they are spurred or removed. The readiness with which spur clusters on the pear extend and duplicate themselves as they increase with age renders it necessary that they should be frequently reduced. As a rule, these spur clusters will continue to extend and branch from year to year, with the result that these fruit-producing parts are steadily extending some distance from their base. The wood between the main arms and the bud terminals becomes harder and crinkled, and as a consequence the sap flow is to an extent checked, and the general vitality of the spur is much impaired. Since it is a good sound policy to have the fruit buds some distance from the source of food supply, these spur clusters should be shortened in frequently, reducing them to perhaps half a dozen well-spaced buds. Much, of course, depends on the extent to which the main arms are furnished with this desirable class of wood, and the extent of thinning or of the elimination must largely be determined by the general spacing of the spurs.

Regulating to guard against overcrowding is the main consideration, and this, with the frequent reduction of the branching spurs to keep them reasonably close into the main arms, will result in a more regular cropping and the production of a better class of fruit.

Weaning a Foal.

"At what age should a foal be weaned"

If the dam has a good milk supply and can be allowed freedom from work it is to the advantage of the foal to be allowed to suckle until the latter is six months old before weaning. When the mare is to be again mated soon after foaling, or when the dam and foal are not doing well, it is advisable to wean the foal at an earlier age, say, four months. While the foal is suckling it is always advisable to encourage him to take a little grain, bran and chaff, gradually increasing the amount. This will make the weaning process easier to carry out, for the quantity of milk consumed will have gradually decreased. Complete separation will then cause little setback to the dam or foal.

When the foal is taken away from the mother, keep them well separated and place the foal in quarters where he will not get injured while fretting for his mother. After the foal is removed, the mare, if giving a good supply of milk, should have her ration, especially of grain and green feed, reduced, and if the udder becomes full and causes her discomfort, it should be relieved by stripping and removing some, but not all, of the milk. Rubbing a little belladonna liniment into the udder will also assist in drying her off.

Winter Treatment for Black Spot of Vines.

Seeking information as to the winter treatment for Black Spot of Vines, Mr. A. G. Strickland, M.Sc. (Chief Horticultural Instructor) has advised a member of the Mypolonga Branch of the Agricultural Bureau that the acid iron solution is prepared in the proportions of 20lbs. sulphate of iron, 8lbs. commercial sulphuric acid, 10galls. water.

Dissolve iron sulphate crystals in a little hot water, add remainder of 10galls., and run acid carefully down a stick into the water to avoid splashing. The acid and the final mixture are both very corrosive and should not be permitted to come in contact with skin or clothes. A wooden vessel should be used for mixing.

This mixture is swabbed on the dormant vines with mop or brush at the rate of 15galls. to 20galls. per acre. Heavily tarred buckets are useful for carrying the swabbing solution round the vineyard, and a small quantity of baking soda should also be carried in order to neutralise the solution if accidentally splashed on clothes, skin, &c.

Sulphuric Acid Spray, 10 per cent. A 10 per cent. solution in water of commercial sulphuric acid is a satisfactory spray, but as this solution is corrosive, special spraying kit is necessary. An ordinary knapsack spray, specially lead coated to prevent corrosion, is very useful and is not costly. Spraying outfits worked by compressed air are also sometimes used. After use, all spraying equipment should be well flushed with lime water.

In swabbing for this disease, it is desirable to swab vines within 3yds. or 4yds. of all vines which were affected the previous year, and to carry out the operation in fine, calm weather. The vines should be thoroughly swabbed all over, special attention being given to the previous season's wood. If suitable spraying equipment is not available, I would suggest swabbing; it is not necessary, of course, to swab all vines, but only those in the vicinity of affected patches last year.

Rainfall Table.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of July, 1936, and also the average precipitations for July, and the average annual rainfall.

Station.	July, 1936	Av'ge. for July.	To end July, 1936.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	0 38	0·21	2·01	4·62
Marree	1·06	0·31	2·49	5·83
Farina	0·84	0·35	2·71	6·37
Copley	0·54	0·45	2·99	7·85
Beltana	0·23	0·54	3·47	8·47
Blinman	0·84	1·06	3·81	11·81
Hookina	1·10	1·13	5·56	11·18
Hawker	1·87	1·24	5·69	12·22
Wilson	1·78	1·18	7·05	11·77
Gordon	1·16	0·91	4·52	10·46
Quorn	1·37	1·42	5·32	13·15
Port Augusta	0·87	0·71	5·33	9·40
Bruce	1·33	0 92	8·24	9·74
Hammond	1·23	1·02	6·15	11·11
Wilmington	2·35	1·99	11·20	17·28
Willowie	1·43	1·25	6·08	12·22
Melrose	4·20	2·81	14·45	22·85
Booleroo Centre	2 19	1·59	7 29	15·21
Port Germein	1·57	1·13	6·51	12·53
Wirrabara	2·53	2 34	8·46	19·25
Appila	1·46	1·54	7·41	14·62
Cradock	1·40	0·96	5·18	10·78
Carrieton	1·93	1·24	6·45	12·19
Johnburg	1·39	0·93	6·45	10·56
Eurelia	1·27	1·24	6·74	12·76
Orroroo	1·80	1·31	7·57	13·20
Nackara	1 90	0·98	12·34	11·09
Black Rock	1·40	1·17	7·17	12·35
Oodlawirra	1·81	1·01	8·26	11·67
Peterborough	1·97	1·22	7·63	13·22
Yongala	2·08	1·44	9·40	14·43
NORTH-EAST.				
Yunta	1·51	0·57	5·12	8·84
Waukaringa	1·22	0·57	5·12	7·89
Mannahill	0·80	0·57	3 53	8·16
Cockburn	1·03	0·50	5 24	7·91
Broken Hill	0·97	0·70	4·79	9 50
LOWER NORTH.				
Port Pirie	1·75	1·21	7·75	13·19
Port Broughton	2·20	1·48	5·96	13·85
Bute	1·94	1·89	7·76	15·39
Laura	1·86	2·02	9·34	17·97
Caltowie	1·69	1·74	7·98	16·76
Jamestown	1·96	2·00	8·85	17·72
Gladstone	1·59	1·78	7·27	16·32
Crystal Brook	1·84	1·64	7·54	15·76
Georgetown	1·84	2·02	8·74	18·29
Narridy	1·60	1·67	6·47	15·77
Redhill	2·44	1·86	9·71	16·54
Spalding	1·98	2·02	8·03	18·74
Gulnare	2·15	2·13	8·83	18·59
Yacka	2·23	1·70	8·33	15·38
Koolunga	1·91	1·71	6·61	15·32
Snowtown	2·12	1·73	9·33	15·70
LOWER NORTH—*continued.*				
Brinkworth	2·05	1·69	7·04	15·73
Blyth	2·34	1 82	9·32	16·73
Clare	4·14	3·05	15·32	24·45
Mintaro	3·98	2·81	13·31	23·36
Watervale	4·61	3·11	16·09	26·74
Auburn	3·08	2·96	13·47	23·96
Hoyleton	2·75	1·91	11·05	17·27
Balaklava	1·54	1·66	7·08	15·43
Port Wakefield	1·06	1·34	6·68	12·93
Terowie	1·86	1·30	9·81	13·34
Whyte-Yarcowie	1·58	1·38	10·24	13·58
Hallett	1·87	1·83	8·45	16·41
Mount Bryan	2·06	1·97	9·80	16·77
Kooringa	2 09	2 14	9·68	17·81
Farrell's Flat	2 89	2·13	12·14	18·54
WEST OF MURRAY RANGE.				
Manoora	2·90	2·11	10·25	18·94
Saddleworth	3·25	2 23	12·25	19·59
Marrabel	3·01	2·30	11·45	19·96
Riverton	2·72	2·39	12·31	20·79
Tarlee	2·56	1·94	10·32	18·09
Stockport	2·60	1·80	10·41	16·97
Hamley Bridge	1·93	1·76	8·82	16·52
Kapunda	2·62	2·29	10·37	19·76
Freeling	1·95	1·97	8·33	17·79
Greenock	3·18	2·48	11 15	21·47
Truro	2·85	2·31	10·24	19·79
Stockwell	2·85	2·32	10·47	20·04
Nuriootpa	3·02	2·47	11·88	20·68
Angaston	3·28	2·69	12·31	22·32
Tanunda	3·72	2·61	11·74	21·94
Lyndoch	3·12	2·95	9·49	23·27
Williamstown	3·80	3·63	11·67	27·61
ADELAIDE PLAINS.				
Owen	1·91	1·60	9 96	14·64
Mallala	1·63	1·80	8·34	16·49
Roseworthy	2·08	1·94	8·14	17·42
Gawler	2·32	2·18	8·88	18·85
Two Wells	1·28	1·82	7·57	15·76
Virginia	1·49	1·93	9 22	17·20
Smithfield	2 06	1·97	8·40	17·65
Salisbury	1·88	2·09	7·08	18·56
Adelaide	2·30	2 64	10·04	21·14
Glen Osmond	3·12	3·36	12·10	25·97
Magill	2·62	3·12	10·56	25·37
MOUNT LOFTY RANGES.				
Teatree Gully	2·82	3·17	10·17	27·07
Stirling West	6 66	6·24	22·23	46·95
Uraidla	6·61	5·89	18·95	43·95
Clarendon	3·97	4·23	15·81	32·79
Happy Val'y Res.	2·77	—	11·78	—
Morphett Vale	2 57	2·88	10·03	22·59
Noarlunga	2·26	2·68	10·98	20·33
Willunga	3·61	3·60	11·74	25·97
Aldinga	2·89	2·68	10·37	20·21

RAINFALL—*continued.*

Station.	July, 1936.	Av'ge. for July,	To end July, 1936.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	3·71	4·41	13·81	29·42
Inman Valley	3·70	—	14·56	—
Yankalilla	3·24	3·11	10 37	22·76
Mount Compass	4·70	4·81	16·79	—
Mount Pleasant	4 09	3·57	15·26	27·11
Birdwood	3·90	3·86	13·10	29·07
Gumeracha	4·42	4·26	13·06	33·31
Millbrook Res.	4 79	4·44	13 89	34·47
Lobethal	5·20	4·94	16·07	35·91
Woodside	3·95	4 29	13·71	32·15
Hahndorf	3·86	4·67	14·59	34·77
Nairne	3 15	3 69	13 60	28·12
Mount Barker	4·27	4·22	14·22	31·24
Echunga	4 40	4·21	17 04	33·25
Macclesfield	3·83	4·02	16·30	30·34
Meadows	4·51	4·74	17·57	36·02
Strathalbyn	2·42	2 49	12·32	19·32
MURRAY FLATS AND VALLEY.				
Meningie	2·46	2·34	10·27	18·31
Milang	2·14	1·79	9 82	14·89
Langhorne's Ck	2·46	1·72	10·99	14·91
Wellington	2·57	1·48	10·65	14·65
Tailem Bend	2·75	1·49	11·80	15·06
Murray Bridge	2·17	1·36	10·15	13·51
Callington	1·90	1·73	9·27	15·15
Mannum	2·31	1·13	7·99	11·48
Palmer	3·14	1·75	11·58	15·59
Sedan	2·12	1·18	6·69	12·05
Swan Reach	1·95	0 91	7·02	10·65
Blanchetown	1·68	0·88	7·37	11·01
Eudunda	3·50	1·86	11·84	17·15
Point Pass	3·70	1·86	12·18	16·72
Sutherlands	2·06	1·01	7·79	10·81
Morgan	1·57	0·70	6·00	9·16
Waikerie	1·96	0·70	8·58	9·66
Overland Corner	2·02	0·76	8·24	10·25
Loxton	2·38	0·92	7·88	11·50
Berri	2·45	0·82	8 31	10·13
Renmark	3·21	0·78	9·59	10·38
WEST OF SPENCER'S GULF.				
Eucla	2·04	0·89	4·90	10·02
Nullarbor	1·06	0·97	3·32	8·85
Fowler's Bay	1·51	1·72	6 45	11·19
Penong	1·61	1·69	6 28	12·22
Koonibba	1·93	1·59	5 53	12·09
Denial Bay	1·99	1·49	6·20	11·19
Ceduna	2·04	1·29	5·68	10·21
Smoky Bay	1·80	1·51	4·99	10·42
Wirrulla	1·49	1·32	4·42	10·51
Streaky Bay	3 15	2·34	6·41	14·85
Chandada	2·15	1·91	4·31	12·42
Minnipa	3·75	1·81	6·98	13·91
Kyancutta	3·30	1·73	6 75	12·77
Talia	3·09	2·31	5·71	14·76
Port Elliston	3·04	2·62	6·76	16·51
Lock	2·76	2·23	7·22	16·34
Mount Hope	4·30	—	8·30	—
Yeelanna	3·66	2·52	6·99	15·94
Cummins	3·43	2·86	7·60	17·58
Port Lincoln	3·20	2·98	8·75	19·37
Tumby	2·91	1·96	6·69	14·25
Ungarra	3·45	2·43	8·00	16·87
Port Neil	2·63	1·51	6·14	13·11

Station.	July, 1936.	Av'ge. for July.	To end July, 1936.	Av'ge. Annual Rainfall.
WEST OF SPENCERS GULF—*continued.*				
Arno Bay	1·75	1·48	5·18	12·71
Rudall	2·10	1·61	5·99	12·98
Cleve	1·95	1·68	7·19	14·88
Cowell	1·25	1·01	6·86	11·07
Miltalie	1·65	1·35	6·97	13·70
Mangalo	1·53	1·55	9·11	13·86
Darke's Peak	2·05	1·79	6·96	15·08
Kimba	1·88	1·39	4·47	11·68
YORKE PENINSULA.				
Wallaroo	1·56	1·56	6·36	13·97
Kadina	1·41	1·91	6·31	15·60
Moonta	1·36	1·83	5·69	15·06
Paskeville	1·24	1·86	10·03	15·47
Maitland	1·93	2·51	7·75	19·85
Ardrossan	1·67	1·54	6·03	13·95
Port Victoria	1·44	1·87	5·46	15·41
Curramulka	1·82	2·35	7·33	17·81
Minlaton	1·92	2·29	7·39	17·74
Port Vincent	1·40	1·69	5 82	14·38
Brentwood	1·81	2·04	5·65	15·54
Stansbury	2·07	2·19	7·04	16·81
Warooka	1·99	2·59	6·60	17·44
Yorketown	1·96	2·31	6·33	16·83
Edithburgh	1·98	2·15	6·04	16·37
SOUTH AND SOUTH-EAST.				
Cape Borda	4·69	4·20	13·21	24·80
Kingscote	2·18	3·02	8·07	19·16
Penneshaw	2·55	2·95	9·25	19·00
Victor Harbour	2·72	2·93	11·66	21·40
Port Elliot	2·64	2·61	12·37	19·94
Goolwa	2·47	2·31	11·73	17·86
Maggea	1·99	0·92	8·98	10·20
Copeville	2·32	0·94	10 61	11·53
Claypans	2·24	0·96	9·30	10·42
Meribah	2·94	1·09	9·45	11·32
Alawoona	2·41	1·02	9·00	10·40
Caliph	2·27	0·86	8·27	10·98
Mindarie	2·77	1 08	8·92	12·23
Sandalwood	2·65	1·29	10·53	13·64
Karoonda	2·96	1·27	10·20	14·17
Pinnaroo	2·83	1·32	9·55	14·36
Parilla	2·41	1·31	9·48	13·72
Lameroo	3·13	1·60	10·20	15·87
Parrakie	2·55	1·43	9·17	14·56
Geranium	2·66	1·71	9·48	16·36
Peake	2·75	1·63	9·24	15·93
Cooke's Plains	2·66	1·64	11·05	15·28
Coomandook	3·36	1·98	10·61	17·03
Coonalpyn	3·31	2·10	10·72	17·61
Tintinara	2·79	2·17	10·67	18·62
Keith	3·09	2·11	10·09	17·93
Bordertown	3·82	2·25	9·95	19·14
Wolseley	4·17	2·13	10·07	18·47
Frances	4·37	2·39	11·40	20·08
Naracoorte	4·27	2·79	11·38	22·63
Penola	2·93	3·28	10·19	25·96
Lucindale	3·97	3·29	13·32	23·38
Kingston	3·18	3·54	13·56	24·24
Robe	3·64	3·97	13·30	24·64
Beachport	4·43	4·46	15·43	27·06
Millicent	4·12	4·35	16·27	29·83
Kalangadoo	4·00	4·51	14·72	32·20
Mount Gambier	3·86	4·06	13·65	30·37

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received, and shows the date and principal business of each meeting:—

Allandale East, 3rd July, Address—A. L. Warren; Appila-Yarowie, 3rd July, Annual Meeting and Social; Arthurton, 16th July, Annual Meeting; Balumbah, 30th June, Annual Meeting; Baroota, 8th June, Paper—H. Jaffrey; Blackheath, 9th July, Annual Meeting; Black Rock, 23rd June, Annual Meeting, 6th July, Wool Demonstration; Booborowie, 29th June, "Improving Carrying Capacity" — W. Gunn, "Colt Breaking"—P. Kilderry; Booborowie, 20th July, "Bulk Handling Wheat"—A. D. McDonald, M.P.; Booleroo Centre, 1st July, Address—C. A. Goddard; Boor's Plains, 2nd July, Paper—C. Yelland; Brimpton Lake, 7th July, Annual Meeting; Brinkley, 8th July, Annual Meeting; Brownlow, 1st July, Address—W. C. Johnston; Butler, 25th June, Address and Demonstration—C. A. Goddard, 13th July, Annual Meeting; Cambrai, 1st July, Annual Meeting; Carey's Gully, 13th July, Address—W. H. Bishop; Chilpuddie Rock, 7th July, Discussion; Coomandook, 26th June, Formal; Coonalpyn, 13th July, Paper—C. Tiller; Cungena, 2nd July, "Fallow v. Ley-land"—A. Taylor and C. Ayliffe; Echunga, 8th July, Annual Meeting; Frayville, 4th June, "Collar Repairing"—A. Hinton, 2nd July, Paper—G. A. Quast; Goode, 11th June, Wool Demonstration; Green Patch, 2nd July, Annual Meeting; Greenock, 19th June, "The Percheron Horse"—A. J. Melrose, M.P.; Hartley, 1st July, Annual Meeting; Hilltown, 7th July, Paper—L. Duckmanton; Inman Valley, 16th July, Annual Social; Ironbank, 1st July, Address—M. Basey; Kelly, 4th July, Wool Demonstration; Koonunga, 1st July, Annual Meeting; Koppio, 1st July, Annual Meeting; Kyancutta, 7th July, Paper—L. Daniel; Kybybolite, 7th July, Annual Meeting; Lameroo, 10th July, Discussion; Lenswood and Forest Range, 29th June, Annual Meeting; Light's Pass, 29th June, Impromptu-Speeches; Lyndoch, 30th June, Presentation of Prizes; Maltee, 4th June, Paper—V. Higgins, 2nd July, Annual Meeting; McLaren Flat, 2nd July, Annual Meeting; Meadows, 7th July, Address; Millicent, 26th June, Paper — H. J. Hutchesson; Miltalie, 23rd June, Address—C. Goddard, 20th July, Annual Meeting; Monarto South, 20th June, Paper—P. Frahn, 18th July, Paper—B. Schenscher; Mount Gambier, 10th July, Annual Meeting; Mount Hope, 7th July, Annual Meeting; Nantawarra, 29th June, Annual Meeting; Narridy, 4th July, Discussion; Nelshaby, 2nd July, Annual Meeting; Nunjikompita, 2nd July, "Care of Farm Horses"—C. Gum; Nunkeri, 25th June, Annual Meeting; Paskeville, 7th July, Annual Meeting, Address—W. J. Spafford; Penola, 10th July, Annual Meeting, "Breeding Ewes"—A. J. Ricketts; Penwortham, 20th May, Address—W. C. Johnston, 24th June, "Banking"—J. Skinner; Pygery, 16th June, Address—C. Goddard; Redhill, 10th July, Annual Meeting; Rosedale, 6th July, Address—F. E. Waddy; Saddleworth, 10th July, Annual Social; Scott's Bottom, 7th June, "Rabbit Destruction"—O. Ringvall; Shoal Bay, 7th July, Annual Meeting; Snowtown, 10th July, Annual Meeting; South Kilkerran, 13th July, Annual Meeting; Springton, 1st July, "Agriculture in Primary Schools"—J. Trenorden; Sutherlands, 2nd July, "Horse Breeding"—E. Loffler; Taplan, 25th June, "Fodder Conservation"—E. H. Schulze; Truro, 20th July, "First Aid"—R. K. Butler; Ungarra, 13th July, Paper—W. Gordon; Upper Wakefield, 2nd July, Question Box; Waikerie, 13th July, Annual Meeting; Wallala, 11th July, Annual Meeting; Wandearah, 7th July, Discussion—"River Broughton Floodwaters"; Warcowie, 16th July, Address—R. C. Scott; Warramboo, 10th July, Paper—N. Chilman; Wasleys, 4th June, Question Box, 24th June, Address—D. K. Dunsmore; Weavers, 6th July, "Improving the Condition of Wheat for Marketing"—J. A. Bridges and L. S. Arthur; Whitwarta, 15th June, "Care of Farm Machinery"—A. J. Angel; Wilmington, 14th July, Annual Meeting; Yadnarie, 14th July, Annual Meeting; Yandiah, 12th June, Address—E. L. Orchard.

The Percheron Horse.

[Paper read by Mr. A. J. Melrose, M.P., at a meeting of the Greenock Branch, held on 15th June, 1936.]

Investigations into the origin of the Percheron horse have disclosed that this breed is one of extreme antiquity, having been bred within itself both in locality and blood for many centuries. An extensive and painstaking inquiry instituted by Mr. Alvin H. Sanders, D.Agr., L.L.D., the author of several well known books on stud-breeding, undertaken on behalf of the Percheron Society of America and with the whole-hearted co-operation of the French Ministry of Agriculture, established beyond all doubt that the Percheron horse has existed as a distinct type from very ancient times, that the increase in weight to present-day standards is the result of selective breeding from within, and that much that has been accepted on insufficient evidence in the past relating to the development of the breed since the beginning of the nineteenth century must now be discarded as mere tradition. The facts brought to light for the first time and published by Sanders and Dinsmore as "A History of the Percheron Horse" (to which publication I acknowledge my indebtedness), contradict flatly the part so long alleged to have been played by Arab blood in the production of the latter-day Percheron; and while this diligent study of old records—apparently never heretofore examined by those assuming to write early Percheron history—may be regarded as destructive to that extent in its operation, it has supplied instead a complete, authentic, official set of facts based upon the solid rock of verified Government records, indisputable and convincing.

"Calypso," leading American sire and prizewinner, showing typical muscular development.

[From "History of the Percheron Horse."

La Perche, the district in France from which this horse takes its name, is situated in the north-west of France, and comprises the departments of Orne, Sarthe, Eure-et-Loire, and Loire-et-Cher, an area measuring about 53 by 66 miles, centred upon the town of Nogent-le-Rotrou, some 80 miles south-west of Paris. Only foals which are the progeny of registered dams and sires of the Percheron breed, and born within this elliptical area, are eligible for registration in the Percheron Stud Book of France. The birthplace of the modern Percheron is found within 18 or 20 miles of Nogent, a territory which includes a little of all four of the departments. The great breeding centres of the Percheron race at this date and for many years past have been Nogent-le-Rotrou in Eure-et-Loir, La Ferté Bernard in the Sarthe, and Mortagne in Orne.

A trade in horses has always been a leading feature in the history of this locality, as a census of horses compiled in 1718 shows that there were no fewer than 6,278 brood mares there at that time. It is recorded also that in 1754 Nogent held a weekly horse market, at which 50 to 60 entires and about 20 mares changed hands, whilst at Laigle 1,070 horses were sold in the same year, besides markets at numerous other towns. The demand for these horses seems to have been largely for use in coaches, because of their trotting qualities, and further because ploughing and other agricultural work was done in those days by oxen.

It was not until about 1820 that horses began to be used in agriculture, and a demand for heavier horses for this purpose manifested itself sufficiently to induce a studied effort to increase the size and weight of the breed, and the French Government began to maintain heavy draught stallions at its stud farms. These Government stud farms, or haras, were established and maintained in the first place with a view towards encouraging the production of horses suited to the requirements of military service, and for many years used stallions of saddle and coach types, but about 1808 the authorities commenced to purchase heavy draught types as well, and in 1822 the first mention is made in their records of a Percheron stallion as such. From then onwards there gradually developed the present system whereby the French Government reserves to itself the first offer of all Percheron stallions for sale in France. In 1818 State encouragement took a very definite step, for we find in that year the first reference to Government inspection and approval, not only of stallions, but also of mares suitable for mating with them, with appropriate prizes for the best, and annual allowances for their upkeep by their owners. The predominating colour of the horses included in these early records was grey, the heights given running about 16½ hands.

From the earliest times the Perche farmer has been a producer of horses and not a buyer from elsewhere, and an understanding of this fact is of fundamental importance in attempting to grasp the reasons for the Percheron's latter-day popularity. It is this history of practically centuries of breeding from within the limits of its own district that should recommend the Percheron to the astute Australian studmaster or farmer, establishing as it does a basis for his prepotency in crossing with other breeds, and his ability to stamp upon his progeny the hall-mark of courage, soundness, and colour which has been his long heritage. What the farmers of the Perche were in the olden times, so are they to-day in so far as relates to their devotion to home and land and horses. Their horses are a part of their inheritance, particularly prized, and accustomed to the affectionate attention of the whole household. Their docility, growing out of this intimate human companionship, has become an inborn trait.

The physical features which characterise the modern Percheron are his strength, his activity, his constitution, and, above all, his great intelligence, and his extraordinary docility. In outward appearance, he should be grey or black, and a typical stallion should weigh about 2,000lbs. in good condition, his height ranging from 16½ to 17 hands. Seen from the front, he should present great width of chest, with a muscular arm, a gracefully curved and massive neck with well-poised intelligent head, strong but refined, carried well up, broad and flat between the eyes, which should be large, set in prominent orbits, brilliant and alert. More refinement is observed about the head and neck of the Percheron than in any of the other draught breeds.

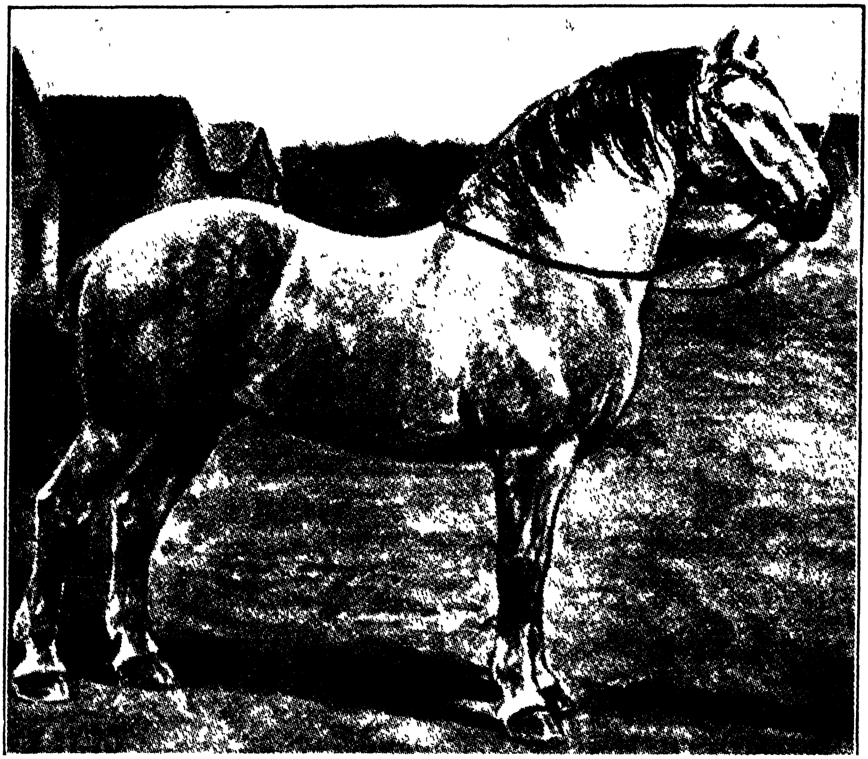
The head is clean-cut and of medium size, and the neck rather short and well-crested. A great deal of importance should be attached to the general physiognomy or facial expression, for a horse possessing obvious intelligence and courage and a strong, attractive personality will always prove a good prepotent sire. The side view should show a deep, well-ribbed body, measuring particularly well at the heart, with a short back and well-sprung ribs, so as to have a deep middle. He should be heavily muscled over the loin, wide and heavily muscled over the rump, thighs, and in the haunches. His legs, which, on account of his breadth of chest, must be set comfortably wide apart, should be free from long hair, possess correctly-sloping pasterns and strong thick-walled black hoofs of more than medium size, high-walled rather than low, while in action he should move freely and easily, and be light on his feet. In action the Percheron is good at both walk and trot. His action at the trot is characterised by a snap which, without doubt, is one of the qualities which account for his popularity, but the absence of hairy legs has contributed very largely also to this popularity where he has to work in muddy conditions, such as fallowing and farm work generally can sometimes produce.

What has been said about the Percheron stallion applies with proper moderation to the Percheron mare. She should stand 16½ hands or a little better, and should weigh from 1,600 to 1,800lbs., and should possess as much refinement about the head and neck as is consistent with her conformation; and though alert she should be of gentle disposition.

It is undoubtedly in his lower extremities that the Percheron differs most, physically, from other draught horses. Let us consider for a moment the mechanism of a horse's foot and its action. The muscle which bends the foot and aids in raising it from the ground lies at the back of the forearm, attached at its upper end to the bones near the elbow, and at its lower end by a tendon, known as the back tendon, which runs down the back of the leg, round the back of the fetlock joint, and finally is attached into the base of the pedal bone, the bony structure of the hoof itself. It must be obvious to everyone that whereas a perfectly straight leg, with no angle at the fetlock to act as a spring, would result in severe jarring of the bones; on the other hand, too long and sloping a pastern, approaching the horizontal, with too much angle at the fetlock, must throw a very much greater strain on these back tendons, resulting in excessive wear and unduly hastening their deterioration. It may be taken that the greater the slope of the pastern the greater freedom does the leg enjoy from shock, but increasingly at the expense of its mechanical leverage or strength. Now, it has been found from actual measurements of what are to be considered as perfect feet among hacks that the slope of the front of the forefoot should be about 50 degrees, with the pastern at 45 degrees, and of the hind foot 55 degrees. I most emphatically contend that what is a perfect piece of mechanism in a hack must be the ideal for all horses, the draught horse merely requiring a larger hoof in proportion to his greater weight, and that from a mechanical point of view it is absolutely essential that these correct angles should be maintained. This ideal has been maintained in the Percheron, and its justification is to be found in his freedom of action, his soundness, and the grace and lightness with which he trots. The very thought of a draught horse trotting creates a mental impression of something ponderous, ungainly and uncomfortable, but the Percheron, however heavy, seems to skim over the ground almost as if he preferred trotting to walking. This I attribute to the perfectly natural conformation of his lower extremities, on the principles just previously laid down.

The durability of this type of foot and leg may be exemplified by quoting the case of the most famous show gelding in his day in the United States, Armour & Co.'s "Mack," off-side leader in the six-horse team which won the Championship at the American International Show in 1906, and which was sent to England in 1907 to attend the Olympic Horse Show. This team subsequently toured Great Britain, and created a sensation that has probably never been equalled in that country. When 15 years of age, and after 9 years of continuous hard service on the streets of Chicago, "Mack" was selected as a perfect specimen of what is required in Percheron geldings, and used for demonstration purposes on an extension train which toured the States during that year and the next. This horse and the others in that famous team exemplified in their conformation well-shaped, durable feet, clean legs and joints, their quality and their long years of service, the characteristics which have made Percheron geldings so popular with the great Chicago meat-packing firms, and with the carrying companies throughout the United States.

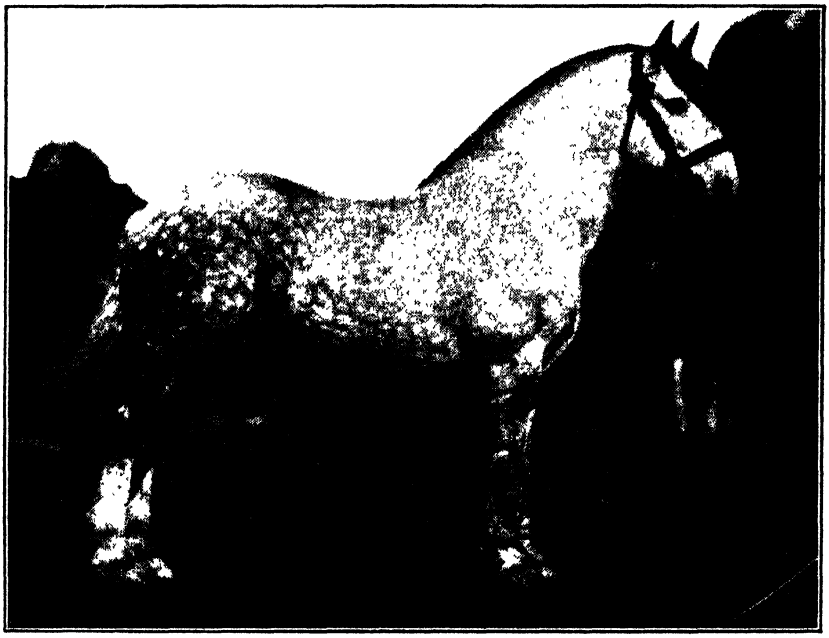
The Percheron has been described as the most neglected breed of horses in Australia, and the force of this stricture is borne upon one by consideration of the position occupied by this breed in America, where it numbers no less than two-thirds of the entire pure-bred draught horse population, while in the whole of Australia there are probably less than 200 all told of pure blood.



"Normandy," or "Pleasant Valley Bill," Imported into America from France in 1851, when the real foundation of the breed was laid down in the United States

[From "History of the Percheron Horse."

The first recorded importation to America of Percheron horses was made in 1839, but it was not until 1851 that the real foundation of the subsequent popularity of the French horse throughout the United States was properly held. In that year three stallions were imported, and two of these, "Normandy" in Ohio, or as he was renamed there, "Pleasant Valley Bill," and "Louis Napoleon" in Illinois, made Percheron history. In volume I of the Percheron Stud Book of America, it is said of the former:—"It is safe to say that he averaged 60 colts a year for 18 years, and that they sold at 3 to 4 years old for an average of $200, many having brought $500, and some as much as $1,000. It was when the United States Government began scouring the country for good horses during the war of the Rebellion that the seal of fame was set upon Pleasant Valley Bill for all time. His progeny readily brought from $50 to $125 more than the common stock of the country where he stood." Louis Napoleon's career in Illinois was equally brilliant, and the stage was now set for the extraordinary expansion in Percheron importing and breeding which was inaugurated in 1881, reaching its climax about 1887. Between 1870 and 1880, 874 stallions and 152 mares were imported from France. Between 1880 and 1890, 4,988 stallions and 2,566 mares, while in 1906 the enormous number of 1,300 stallions and 200 mares were purchased by American importers in that one year alone. To-day, as has already been stated, the Percheron has completely dominated the draught horse population throughout the United States, and has spread his influence into Canada and the Argentine as well.



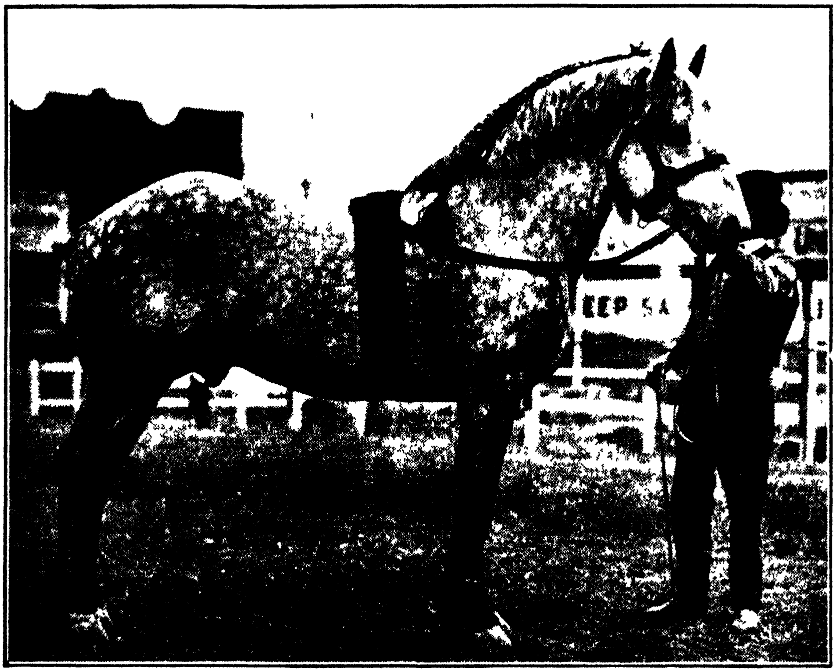
"Rhum," Imported from England into South Australia in 1924 The resemblance in type to "Pleasant Valley Bill" will be noticed

The first definite steps to establish the Percheron horse in Australia were taken by Mr. (now Sir) John Melrose, of Ulooloo, who in 1913 imported one stallion "Larigot," and two mares from France. This was closely followed by a similar importation into New South Wales by the late William Cope, of Werris Creek, and in 1922 by a further importation of six mares and one stallion by the late F. B. S. Falkiner, of Foxlow, Bungendore, New South Wales. Since then a small number of stallions and mares have been brought out from time to time, but the most important acquisitions from abroad have undoubtedly been made in the additions to the South Australian stud, now established at Kadlunga, Mintaro.

In 1924, two stallions were purchased in England for this stud, one a Canadian-bred horse, "Paragon," and the other a French horse, "Rhum." "Paragon," by one of America's leading sires, "Halifax" had won one Championship and six first prizes in Canada before being exported to England, where he was second several times to his future stable-mate.

"Rhum," foaled in 1917, began his show career at Mortagne, one of the principal Percheron shows in France, by winning as a 2-year-old in a class of 80 entries. Contact with the Percheron under the extremely trying conditions of the Great War led to their introduction into England, and "Rhum" was purchased at a high figure to go to that country. In the three successive years 1921, 1922, 1923, he was first and champion at the English Royal Show and first and Champion at the Norwich Stallion Show. He died at Mintaro in 1934. Rhum's career in South Australia, both in the stud and in general service amongst the farmers, completed the good work, the foundations of which had been laid by his predecessor, "Larigot" and definitely established the Percheron in its present-day popularity througout the entire State of South Australia. It was, in this respect, remarkably similar to that of "Pleasant Valley Bill" in the United States, and, while "Rhum" was much the heavier horse of the two, they bore a striking physical resemblance as well.

In 1933 the stallion "Histon Grey Friar" was added to the Kadlunga stud. "Grey Friar" had in the previous year, as a 2-year-old, won not only the Junior Championship at the English Royal Agricultural Show, but also the open Senior Challenge Cup. These two horses, "Rhum" and "Grey Friar," possessed many qualities in common with one another. Both were upstanding grey horses, measuring well all over, and personifying all the best qualities of the Percheron, their finely-chiselled heads well up, giving them a remarkably noble bearing. "Grey Friar" is to-day probably the most widely-known and popular draught horse in Australia. The availability of such horses as "Rhum" and "Grey Friar" must always be of inestimable benefit to the horse-breeding industry in any country, if regarded solely from the commercial point of view, but when horses of such high standard are entrusted with the pioneering of a breed in a new setting, that breed and that country are indeed fortunate. The history of the Percheron horse in every country into which it has been



"Histon Grey Friar," 3 years old, Imported into South Australia from England in 1933.

introduced is one of sure and steady progress, and consequently it may be confidently expected that the popularity of this breed in Australia will be so much the more accelerated by the influence of these two remarkable horses.

A very natural question invariably asked by inquirers wishing to inform themselves about the Percherons is, "Are they strong and active?" While it is easy to lay claim to these virtues in describing any horse for which one has a strong partiality, the claim may be better justified and the better driven home by concrete example. Of the former quality of the Percheron, although many instances might be quoted such as that of the half-bred gelding at the Mintaro slate quarries, who walked off with 6½ tons, perhaps the outstanding performance is that of Mr. P. McGregor Reid's three-quarter Percheron gelding, "Nugget," who, in January, 1935, at the Merildin wheat stacks, pulled a trolley weighing 2 tons 14cwts. 42lbs. loaded with 100 bags of wheat weighing 8 tons 8cwts. 50lbs., or a total of 11 tons 2cwts 92lbs., a distance of 6ft. "Nugget" is by "Rhum" from a "Larigot" mare, as also is "Paris," a dray horse in constant work at Clare, winner of many prizes, who can substantiate with no equivocation the Percheron's claim to activity. "Paris's" normal weight is over 2,000lbs and, with his stable-mate, a half-bred son of "Rhum," weighing only a little less, he has been timed to walk 5 miles in an hour, pulling a loaded dray. But perhaps the walking ability and the stamina of these horses can best be illustrated by the performance of the stallion "Kilometre," who has, when necessity arose on his rounds, on several occasions traversed a distance of over 30 miles, carrying out his stud duties *en route*.

These walking performances are not unique in the annals of the Percheron in South Australia, but, while taken alone, they are indeed meritorious, when taken in conjunction with the proved strength, constitution, docility and intelligence of this fascinating breed, they constitute a formidable challenge to all other breeds of draught horses for that supremacy in the equine world which would entitle them to reign "first in war, first in peace, and first in the hearts of their countrymen."

Prevention of Sore Shoulders on Horses.

In the course of a paper read at the annual meeting of the Karte Branch on 3rd June, Mr. A. H. Gum stated that the best preventive of sore shoulders was a well-fitting collar. A collar should not be so large as to move about, nor yet so small as to pinch the horse's neck. A collar should be fitted to a horse before putting on the hames. Any dirt or old scabs should be cleaned from the collar, and any parts of the mane which might be caught between the collar and the shoulders should be freed. When breaking in a young horse, an old, soft collar would be good enough, provided it fitted fairly well, but when the horse grew to maturity, a collar should be stuffed and lined to fit the horse perfectly. The collar should be used on that horse alone, and never placed on any other. It was a good plan to take the horse to the saddler and let him have a look at the horse's shoulders, so that he could shape the stuffing and lining to fit. One cause of sore shoulders was in turning too abruptly at headlands. The team should never be pulled around with a swing, as they tramped on each other's feet, and it placed too much strain on the one shoulder. Trace chains of unequal length were another cause of sore shoulders. Where a horse had a lump or a bad sore on the shoulder, a good saddler could make a depression in the collar by moving the stuffing, so that the pressure on the sore would be relieved. Such a practice should only be tried where a horse had had a sore for a long time in the same place.

Erection and Care of Farm Buildings.

In the course of a paper read at a meeting of the Boor's Plains Branch on 4th June, Mr. M. D. Wright stated that in the last decade many changes in the construction of farm buildings had taken place. At one period the branches of any convenient tree were considered sufficient covering for farm implements, but with the advent of machinery more subject to deterioration by weather, farmers realised that the tree shelter was inadequate, and there emerged the shed with the thatched roof. Many such sheds were still in use. Some farmers desired a more permanent and durable shelter, and stone, which abounded in the district, was used. Stone buildings were by far the best, although at the present time very little stone was used. With the introduction of galvanized iron at a price within the average person's means, the building trade was revolutionised, stone being discarded in favour of iron. It was safe to assume that in erecting any stables, machinery or stock sheds, galvanized iron would be the material selected. Care should be given to the location of a building. Very often sheds had been erected in unsuitable surroundings because of lack of forethought. A site on rising ground was necessary to ensure good drainage; it should also be sheltered if possible. One should visualise any building that might be erected in the future, and endeavour to plan them as compactly as possible. Nothing looked worse than scattered buildings without any regularity or conformity. Jarrah and oregon were the timbers most used. Jarrah was a hard timber suitable for standing up to adverse weather conditions, and one that was not attacked by white ants. All uprights should be of jarrah, and if thought advisable, concreted into the ground. Uprights and also oregon cross-pieces should be of sufficient dimensions to withstand the weight placed upon them.

Roofing.—In roofing a shed care should be taken to see that the pitch was not too steep. On all large buildings a gable roof was advisable. It afforded a catchment on two sides, lessened the wind resistance, and helped to make the interior well ventilated and lighted. Flat roofs were quite successfull on small buildings, and if finished correctly proved effective in withstanding severe winds. When erecting a building adjoining another, it was often the practice to erect a well roof or box gutter. In most cases they proved a source of trouble, and should be avoided wherever possible.

Doors.—Two varieties of doors were most commonly used, the swinging and the sliding. An excellent door of the swinging type could be made with wire-netting tacked to the framework. The lower half of the door could be covered with iron to ensure protection. When open, the door allowed the wind to pass through without swinging as would a door entirely closed with iron. Swinging doors were suitable for sheds housing heavy machinery, because there were no runners to be damaged when moving the implements to and from the shed. Sliding doors were most suitable where the framework was entirely closed with iron, as they were better able to withstand the weight. In erecting sliding doors, some favoured rollers on steel rails overhead with guides at the bottom, others rollers top and bottom, while some favoured rollers at the bottom with timber guides at the top. In finishing a shed it was necessary to provide a gutter of sufficient dimensions to cope with the catchment area of the roof, as well as good down-piping. Properly erected farm buildings could be attractive to the eye, as well as adding to the value of the property.

Delegates at the Conference of Upper North Branches, held at Eurelia on 15th July, 1936.

Agriculture in Germany

[By Dr. W. E. Meier, Renmark.]

In this short paper on "Agriculture in Germany" one realises how difficult it is to give a true appreciation of the facts.

So far as the writer is able to judge, Germany is the one nation with a true peasantry.

The first completed Motor Road, Frankfurt on Main-Darmstadt

In using the word "peasant," one realises that it unfortunately carries a kind of stigma, just as the German equivalent, "bauer," did, but we should accustom to interpreting it in its true sense, for the best citizen and the most vigorous stock is to be found in the peasant class. Of late, there has been much talk of immigration being recommenced. There is sufficient evidence in South Australia alone to prove that the best and most solid type of immigrant is the peasant, and not that element which prefers to live a comfortable life in the city with a minimum of labour. There must be men who are "bound to the soil" for any race of people to progress as a nation.

The Germany of to-day is one which has its foundations in a strong and vigorous peasantry, and this fact must be fully grasped to comprehend National Socialist Policy.

To understand fully the present position of agriculture in Germany, a brief review of the general conditions prevailing before the advent of National Socialism must be given.

Industry and agriculture in Germany were in a state of chaotic decay, which was particularly noticeable in the larger and essentially industrial cities and towns. Unemployment had risen to unprecedented heights, and it was fast increasing; this despite the fact that Germany's export trade showed a large active balance. On the one hand, there was increasing poverty, and that with the majority, while a select few were enriching themselves at the expense of others. Everything, including agriculture, was regarded as a means to make more money, and so money was fast being used to smash the good solid peasant and make him the slave of the directors of high finance. As prices were such that even the best and most rational management could scarcely make ends meet, many people on the land adopted a resigned attitude and waited for the apparently inevitable. With the advent of Hitler to power the position of the agriculturists in Germany was changed suddenly and radically.

Vineyards on the Rhine

The Peasant.

A definite distinction was made between the man who utilises land merely as a revenue-producing project and he who is bound to the soil, whose life is intimately bound to his property —the peasant. While making this distinction, it is not intended to belittle those who are not peasants in the true sense. It is possible for them to become peasants also.

Who, then, is a peasant, and what special obligations is he under?

The peasant is the owner of an inherited agricultural property with an area which cannot exceed a certain maximum. He is the source of new blood—the "life blood" of the nation and the guardian of his race. The peasant must be a German subject, of Aryan decent (includes Romans, Slavs, &c., but not Jews, Mongolians, &c.), an honourable and decent citizen and capable of managing his property well. Failure to live up to his obligations renders him liable to expulsion, in which case his heirs inherit the property.

From this it will be seen that a purely material and individualistic attitude towards agriculture and life generally cannot be taken by the true peasant, and it is the true peasant that Hitler is protecting and recreating. To imbue the peasant himself with a sense of pride, conscientiousness of his position and responsibility, the traditional customs, dress, &c., have been revived and given their righteous place of honour in German national life. Whereas particularly the simple type of peasant was looked down upon and ridiculed by those who were fortunate (or unfortunate) enough to live in towns or cities, peasantry has now been raised to a position of honour. It now forms an aristocracy with very definite duties and responsibilities and protection by the State.

Immediately Hitler attained to power, a law was enacted preventing the forced sale or breaking up of peasant farms. To secure and protect the peasant and legalise all decrees pertaining to inheritance, a comprehensive law was passed, the essentials of which set out as follows:—

(1) What determines an hereditary farm.
(2) What is a peasant.
(3) The order of succession to such a farm.
(4) The sale, mortgaging, leasing, and forced sale.
(5) The Arbitration Court instituted solely to protect the peasant.

The minimum size of a holding is that which will comfortably sustain one family, and will vary with soil, climate, &c. The maximum size is determined largely by tradition and may be in the vicinity of 300 acres in the poorer districts. He who owns such an hereditary farm is a peasant, provided that the obligations mentioned above have been fulfilled satisfactorily, The peasant is required to farm well and make full use of his land.

Forced sale of the holding is not permitted on principle. Leasing, mortgaging, and disposal of a portion are all subject to the sanction of a special court. In cases of dispute the specially instituted Arbitration Court makes the decision, to which the peasant may appeal at any time. As large portions of Germany are industrialised, and a high percentage of the population lives in cities, a numerically strong peasantry is essential to supply new blood and so maintain the vitality of the nation. By reclamation and drainage, more than 5,000,000 acres of land can be put under the plough and new peasant holdings created. With the aid of Labour Service this land is slowly being won and young men trained to take over as the farms are established.

The General Climate of Germany.

The climate varies considerably from north to south and from east to west in regard to rainfall, soil, and character. Towards the east it becomes more continental, while the west, and particularly the northern portions, possess a distinctly maritime climate. The rainfall varies from approximately 300 mm. to 1,000 mm. (25 mm. equal 1in.), while the soil of a large part, if not the greater portion of Germany, is a poor white sand. Germany is not a land "where milk and honey flow."

Germany is organised on the basis of the corporate State. Hitler is the supreme head and leader and is, therefore, ultimately responsible for all phases of the national organisation. Directly responsible to him are the Ministers constituting the Cabinet. These Ministers are the heads of their departments and are all experts. The head or leader of the "Department of Agriculture" in Germany is R. Walther Darré (the equivalent of his position in South Australia would be the Director of Agriculture as Minister). To aid him personally, he has a large staff of agricultural experts and also a committee of peasants. The chief institution responsible to the Minister and leader is the Administrative Department which has a large sphere of duty:—

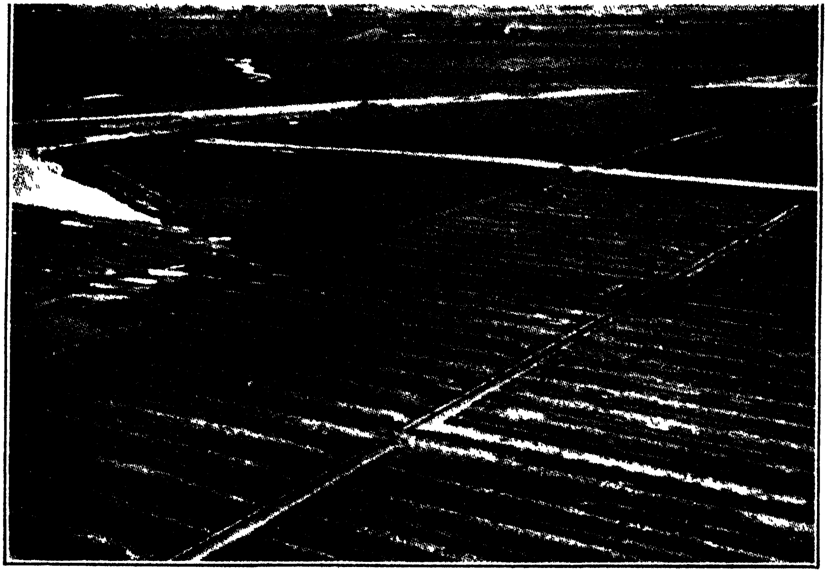
(1) The peasant.
(2) The holding or farm.
(3) The co-operative concerns.
(4) The marketing.

All the marketing and prices are regulated by the Department. Even in its very first year of activity the Minister was called upon to exercise his authority and prevent a glutting of markets by holding back a considerable amount of the abundant products. This was done by instructing peasants, millers, &c., to store a certain proportion of their products. The following year was dry and the surplus from the previous year, brought on to the market judiciously, prevented speculation and sharp rise in prices. Not only is the rigorous control of markets of great value within the country itself, but also it prevents cheap foreign products from flooding the markets and displacing home-grown products, which in turn would eventually mean the extinction of the peasantry and so the annihilation of a nation. The actual agricultural work carried out by the Department of Agriculture is both research, and instruction and assistance to the peasant. The aim of research work is along the lines of improvement and to enable Germany to become self-supporting as far as possible.

In Low-lying Mecklenburg.

In addition to the breeding for improved strains and evolution of improved implements, &c., a large number of lower yielding varieties are prohibited and, of even greater importance, new species and varieties are being adapted to environment. In this respect good progress has been made in adapting the Soy, Bean to European conditions. In the case of the

Lupin—*the* legume for the large tracts of poor sand in Germany—a sweet, *i.e.*, edible variety, has been evolved, and good headway had been made in producing a Lupin with non-bursting pods. As foreign concentrates have been practically excluded, it has become of vital importance to produce and conserve more food rich in protein. For this purpose, the Soy Bean—the richest of all proteinous foods—is being so intensively propagated, and further, the conservation of fodders rich in protein stimulated. Of particular interest, also, is the inoculation of the seed of most legumes to encourage immediate bacterial activity. An experiment with Lupins revealed remarkably even germination and high rank growth compared with a very patchy germination and comparatively stunted growth on the portion not inoculated. On the practical side, the aim is maximum production while maintaining, and, if possible, improving, the soil fertility.



Reclaiming Land on the North Sea Coast.

Instruction is given by experts. Financial assistance is given direct for such improvements as silos, or indirectly in the form of fixed prices within certain limits, or tariff protection against imported foodstuffs.

One large agricultural show is held annually in one of the larger cities. This year it is to be held at Frankfurt. At these shows every phase of agricultural activity is displayed.

With the aid of the Labour Service, which was instituted to bring young men from all social classes together and enable them to learn practically what it means to produce food for the sustenance of the nation, a great deal of land amelioration work is being done. In this way large areas are being reclaimed, streams regulated, and flood banks erected.

Of particular interest are the German forests. One-quarter of its total area is under forest and under no consideration is it permitted to cut down trees indiscriminately, while for every tree cut down the equivalent must again be planted. It is generally acknowledged that trees affect climate. In support of this, the Baltic States might be mentioned, where the forests were ruthlessly cut down after the war, being the only source of revenue. As a result of this, the climate has become very much more extreme and the average annual temperature has fallen by nearly 2° C.

Germany as a Market.

Despite her intensive agriculture there is no possibility of her becoming self-supporting. She possesses a large industrial population, while the greater portion of her 67 millions live in cities. She is therefore a potential market for many primary products, chief among which, from Australia's point of view, are wool, of which she can produce only a very limited amount, and wheat, which blends well with weak wheats. Other products of lesser importance which she will barter for are butter and fruit, particularly apples, and oranges and to a lesser extent dried fruits, but she can buy only with credit and credit can be obtained only by exporting. Failure to obtain sufficient export markets in one country must necessarily lead her to look for them in another and also to produce as much as possible synthetically; and present indications point to the fact that substitutes may be produced for most articles, with the exception of foodstuffs. Here may be mentioned synthetic wool and rubber.

At present Germany has barter agreements with South Africa, Argentine, and Brazil. She has expressed a readiness to absorb 400,000 bales of our wool if her exports are given free access. Great Britain should certainly receive preference to other nations, but she can absorb only a limited amount of our products. It is a question which demands serious thought, whether or not we can maintain pride of place as a wool exporting country without reciprocity.

Conservation of Fodder.

In a paper read at a meeting of the Beetaloo Valley Branch on 1st June, Mr. J. Halse said that a season such as they were experiencing made one realise how careless farmers had been, especially in a district recognised as one of the best in the north. Whenever there was a dry spell of short duration or a late opening of the season, farmers were short of feed, especially sheep feed. With a little assistance, land in the district should be able to carry at least 1 sheep per acre, instead of a sheep to 4 acres, which was the probable rate at present. Every farmer should grow at least 60 to 100 acres (according to the size of the holding) of oats. Half could be cut for hay and the remainder reaped and stored away from the ravages of birds and mice, to serve as a reserve for feeding to breeding ewes just before and during lambing. If the season was favourable and the oats were not required, they could be fed to other stock. Horses thrived better on oaten chaff than on wheaten chaff; and there was always a ready and remunerative sale for surplus oats in outside districts. Another means of growing fodder was to try out lucerne and subterranean clover, especially on the sandy alluvial patches for which the district was noted. Subterranean clover had been tried by some farmers (the writer included), and up to date had not proved very successful, one reason being the low rainfall, which during the past 7 or 8 years had dropped considerably below average. The seed mostly used was of the late variety from the Adelaide hills. The Western Australian or early variety was likely to do better, as it was reported to thrive on a 17in. rainfall.

Wimmera rye grass, sown at the rate of 2lbs. per acre as a cover crop with wheat, would ensure good feed for all stock as soon as reaping was completed. The cost would amount to about 1s. per acre on the present price of seed, and the benefits derived would more than compensate for the initial outlay. The sowing of at least 10 acres of peas was advocated. With the other fodders available it would be possible to top off at least 80 to 100 lambs for the fat lamb market. With the price of super at its present low level, and with the subsidy of 15s. per ton, a more liberal allowance of super would make the district a much more profitable one.

Question Box.

At a "Question Box" held by the Allandale East Branch on 5th June, the following were among the questions dealt with:—*Question*: When should land be harrowed most—before or after drilling grain? *Reply*: It was generally considered that it required more harrowing before drilling. *Question*: What is the best way to get a ewe to mother a lamb which she has left? *Reply*: Mr. Butler suggested that four light hurdles be placed in the paddock in case of such an emergency. They could be used to make a small portable yard in which the ewe and lamb could be shut up together. *Question*: What is the best method to eradicate furze? *Reply*: Constant ploughing was considered the best method. *Question*: What is best time to plant rape and what quantity should be sown? *Reply*: If the land was ploughed before it became too hard, a good deal of moisture was retained, allowing the seed to be sown during November. November was a good time for sowing, as the plants were thus available for autumn feeding. The usual rate of seeding was 3lbs. per acre, using every row of the drill. *Question*: Would the application of lime (crushed limestone) be beneficial to the land? *Reply*: Members considered that it would.

MURRAYTOWN.—Two questions from a previous meeting were discussed at a meeting held on 20th June. The first was "What is summer fallowing and under what soil conditions would it be practised?" *Reply*: Summer fallowing consisted of ploughing the land in February or March (15 months before sowing). It was mainly for dark, sticky soils, to keep them free from weeds. The fallow should be well cultivated throughout the year. Mr. Starr stated that he had tried summer fallow once, but the feed on it had tempted him to leave it until late before cultivating, resulting in a poor crop. Mr. Joppich had tried a small area, as well as ordinary winter fallow. Both areas were treated in the same way at seeding, and the winter fallow returned 1bush. more wheat. *Question* 2: What does it cost to rear a farm team? *Reply*: Service of stallion, £2; mare off work, £2 10s.; feed of foal first 6 months, £2 10s.; vet and medicines, 10s.; 2 years feed, paddock and manger, £12; total £19 10s. Assuming that a good, strong horse was required, stable feed, when paddock feed is low, is included above. Mr. Starr considered that on a small farm it would cost not less than £23, as feed grown on the farm had to be included. The allowance for stallion service was not sufficient. Mr. W. Scholz also thought that the service fees were too low. The average cost of rearing a horse to 2½ years would be £22. However, in rearing one's own horses, one could select the best tempered and best working mare. Mr. N. F. Scholz stated that the average service fee per foal would be £3 10s. The cost of the farm-grown feed for young horses would not be felt so much as it would be if one purchased a 3-year-old horse.

Developments in the Lucindale District.

[Paper read by Mr. R. J. LEGOE, of Lucindale, at a meeting of the Kybybolite Branch on 12th May, 1936.]

In the Lucindale district six hundreds are included in the boundaries of the council, in all about 50,000 acres. Geologically the districts vary very considerably. The Kybybolite district for the most part is red gum country, with the usual red loamy or crab-hole soil, whereas the Lucindale district has an enormous amount of variation from the poorest of scrub country to the richest of peat soil. This peat is said to be almost precisely the same as the famous Irish peat. It is hard to say just what is the proportion of good country to bad in the Lucindale area, but it is safe to say that there are many thousands of acres of which the carrying capacity could be trebled by means of drilling in seed with a liberal dressing of superphosphate. In some quarters it is argued that so much of this district is too wet for any developmental work in its present state. With this I entirely disagree. How any practical man could suggest that this land should be capitalised to the extent of £3 an acre in drainage expenditure is beyond comprehension. All this country has been surveyed and resurveyed for drainage levels. Many thousands of pounds have been spent in skilled labour and motor car expenses. If this equivalent had been advanced to settlers as a low interest loan, the proceeds of which had been spent on super and seed, some concrete results would have materialised.

During the depression one noticed very often that the most progressive type of settlers were the worst off for ready cash, and were not able to do very much improvement work, whereas the well-established settler with money in hand very often decried this development. However, conditions have changed very much in the last three years in the South-East, and if ever we have to face another crisis like that of 1930-34 super will be ranked as almost as important as bread.

Lucindale has been slow to follow the lessons which are to be learnt from Kybybolite district although, of course, the country was held in large tracts showing a good return. The chief arguments against development in the past have been:—(1) Doubt of success. (2) Very much more work entailing much heavier labour responsibilities. This as we all know is a very definite disadvantage. (3) Content with their income which was supplying all their needs and in good years showed a surplus, which eventually was reinvested in more land. All three arguments have something in their favour, especially No. 2.

I belong to the opposite school of thought, and must confess to a weakness for making two blades of grass grow where only one grew before. In the Lucindale district there are many thousands of acres of heath country. With modern implements this can be converted into first-class clover country, carrying from 2 to 3 dry sheep to the acre. The following are the approximate costs:—

	£	s.	d.
2 ploughings at 10s.	1	0	0
Harrowing	0	2	6
Drilling	0	3	0
Harrowing	0	2	6
1 bag of super	0	7	6
Seed, 4lbs. at 1s. 6d., clover	0	6	0
Rye grass	0	2	0
Fencing subdivisions, windmill, &c.	1	6	6
Purchase price of land	0	10	0
	£4	0	0

Or. £2 capital cost per head per sheep on 2 sheep per acre.

The above figures show that if one is prepared to undertake the work the results must be more than worth while. The title of this country is perpetual lease. The Government would be aiding themselves if they converted 2 acres of scrub into freehold title for every 1 acre developed by an owner, and also altered the Act to allow companies to go into this type of investment. If grass country can be bought at about £3 an acre and brought up to the same capacity for an expenditure of £1 then, of course, there is nothing between the two, except that the grass country is probably more conveniently situated. Against this, though, there would probably be fencing expenditure. It was, however, only possible to get grass country at that low figure during the depression. To-day about £5 seems more or less the current price.

In 1919-20 the hundreds of Binnum and Jessie carried 72,000 sheep. During the same year the six hundreds in the Lucindale district carried 88,800 sheep. In 1934-35 the hundreds of Binnum and Jessie carried 147,526 sheep—over 100 per cent. increase and an approximate carrying capacity of ¾ sheep per acre excluding, of course, all cattle, horses, and export lambs. In 1934-35 the Lucindale hundreds had increased to 105,500 sheep, or a little over 20 per cent.

Superphosphate figures are also of interest, but I have reason to doubt that they are quite accurate: Year 1934-35—Super used for Kybybolite district, 592 tons; Lucindale district, 151 tons.

Approximately there were the same number of sheep in the two districts, the small area using four times the quantity of super. Year 1934-35—Super used for Kybybolite district, 2,043 tons; Lucindale district, 869 tons.

The railway figures show that during last season Lucindale handled 1,500 to 1,800 tons of super, nearly all of which must have been spread in the district, hence my reason for doubting the above figures. Very big efforts have been made by some of the Lucindale landholders in the last two years to increase their carrying capacity, and in the near future the results will make themselves manifest. This season satisfactory wool prices will be a further stimulus to development. Really first-class trunk roads are dire needs of both districts, in fact one may include the whole of the South-East under this. To relay the narrow-gauge railway with a bitumen road rather than a broad-gauge railway would be a great step forward. Super and clover are changing the complexion of the pastoral industry, proving beyond doubt that we can produce wool and meat far more economically in districts like our own rather than in the outback arid country. Districts like Kybybolite and Lucindale are rising to take the place of their erstwhile glorious virgin sister of 100 years ago—the saltbush.

Women's Branches.

The following is a list of the Branch reports received, and shows the date and principal business of each meeting:—

Balhannah, 15th July, Annual Meeting; Balumbah, 1st July, Annual Meeting, 22nd July, Appointment of Delegates; Beetaloo Valley, 25th June, Annual Meeting, 2nd July, Annual Social; Belalie, 14th July, Annual Meeting; Boor's Plains, 2nd July, "A Home First Aid Chest"—Mrs. M. Wright; Clare, 4th July, Annual Meeting; Coonawarra, 15th July, Wool Exhibition; Devlin's Pound, 18th May, Papers—Mrs. G. Chesney and Mrs. S. Pickering; Echunga, 1st July, Annual Meeting; Georgetown, 14th July, Address—Mr. M. W. Aird; Gladstone, 16th June, Election of Officers; 10th July, "Let's Make a Pudding"—Mrs. Prior; Hope Forest, 2nd July, Netting Demonstration—Mrs. Jefferis; Kangarilla, 25th June, Birthday Party, 16th July, Scone Afternoon; Karte, 3rd June, Annual Meeting, Cake Recipes; Koolunga, 18th June, Papers by Narridy Members, 14th July, Pruning Demonstration; Laura Bay, 14th July, Annual Meeting; Maltee, 2nd July, Annual Meeting; Mangalo, 8th July, Annual Meeting, "Pastry"—Mrs. Coles; McLaren Flat, 2nd July, "Dried Fruits"—Mr. V. Pool; Millicent, 17th July, Annual Meeting; Monarto South, 18th July, Annual Meeting; Morchard, 22nd July, Discussion; Mudamuckla, 17th June, Address—Mrs. Noske, 15th July, "Wool Rug Making"—Miss Flaherty; Narridy, 6th July, "Dressmaking"—Miss V. Roberts; Nelshaby, 2nd July, Annual Meeting; O'Loughlin, 10th July, Annual Meeting; Owen, 9th July, Address—H. J. Apps; Parilla, 17th June, Paper Flower Making; Parilla Well, 23rd April, Rug Demonstration—Miss Johnston, 16th June, Question Box; Parrakie, 21st July, "Planning Meals"—Miss J. Watts; Penola, 1st July, Question Box; Pinbong, 27th June, "Cows"—Mrs. T. Bilske; Pinnaroo, 3rd July, Discussion; Rendelsham, 1st July, Question Box; Saddleworth, 7th July, Annual Meeting; Sheoak Log, 1st July, Millinery Demonstration—Miss Mortimer; Snowtown, 2nd July, Annual Meeting; Tantanoola, 1st July, Annual Meeting; Taplan, 25th June, Question Box; Warcowie, 16th July (Combined Meeting), Address—R. C. Scott; Wasleys, 2nd July, "At Home"; Williamstown, 1st July, Formal; Wilmington, 2nd July, Annual Meeting; Wirrabara, 16th July, Annual Meeting; Yandiah, 10th July, "Needlework"—Miss R. Keller.

Gardening Notes.

[Mrs. E. C. Lowe, Laura Bay.]

Every home should have both a flower and a vegetable garden; if you cannot have a spacious one, then try a small one. Half hours in the garden will accomplish quite a lot and a garden lover will usually contrive a few half hours. It is essential to procure good seeds from a reliable source, and so make sure they are fresh; most seeds germinate best while they are fresh, though there are a few exceptions that improve by keeping, such as the Native Lilac. The climate should be considered and with regard to vegetables, the needs of the family or household. If a beginner, ascertain what varieties succeed best with your neighbour; your garden conditions may be similar.

Wood ashes are very beneficial at the bottom of the trench for potatoes, peas, carrots, on account of the potash they contain; soot from the stove flues should always be saved for the garden. It is good for most vegetables, also for roses and pot plants if mixed with the soil. Turnips require to be sown while the ground is warm; sow them thinly on soil that has been manured the previous year; new manure causes them to grow too much foliage. They do splendidly in this district if sown through the seed drill with a little super on sandy or free soil; they like the open spaces. A plot of ground should be planted with silver beet, carrots, and parsnips for summer use. They are hardy and useful, and are not worried much with insect pests such as blight.

In the flower garden annuals are very nice and showy in their season, but do not rely on them alone. Plant perennials, too, such as chrysanthemums, geraniums, and the hardy carnation that is nearly always in bloom. A few hardy flowering shrubs, and perennial creepers add much to the beauty of a garden.

It is always helpful to know something of the climate that the various plants are native of, and try and cultivate them as near as possible to their native conditions. The right season to plant must always be considered.

There are a large number of bulbs that should be planted in autumn for spring blooming. They are very easy to grow, and come quickly into bloom. They do not require any moisture, other than the rainfall, unless the season be very dry; then a little watering when showing their buds will help the flowers to open. Bulbs as a rule dislike manure in any form, but dahlia tubers, and gladioli corms are exceptions to this rule, they revel in rich soil and plenty of moisture and a good mulch.

The successful growth of plants in a verandah depends very largely on the aspect and situation. Many beautiful foliage plants that become stunted and scorched on a sunny side, will thrive luxuriantly on a shady verandah. There are others that love the sunny side, and would sicken and die on the shady side. The pots or tubs should be raised off the floor, and placed on bricks or other supports.

Although the work of taking and putting in cuttings is very simple to the gardener or experienced amateur, the novice is apt to overlook several little details of importance. The first point is to select the right kind of growth. This usually should be short-jointed and sturdy; instead of drawn and weak. After having removed the shoots, trim off the lower leaves, cut through the stem directly beneath a joint where the leaves join the stem, as roots shoot more readily from a joint than between two joints. Geraniums root best if laid aside a few days before planting, while most hardwood cuttings root best if planted as soon as taken from the bush before they wither. Many cuttings root best if taken with a heel that is obtained by pulling off a small side branch with portion of the main branch attached; to avoid decay, all cuts must be made with a sharp knife.

Cuttings of various greenhouse plants root well in water, while others root in damp sandy loam. Pots and pans are better than boxes, and the cuttings root more readily around the side than in the centre. Free drainage must be allowed for. Crushed or broken charcoal makes good drainage material. Make the soil fairly firm, cover surface with a layer of sand so that it falls to the bottom of each hole as it is made with a blunt stick. See that each cutting beds firmly on the bottom of each hole, and is not hung suspended with a hollow below it. Carnation piping must be kept moist, but not wet, or they may rot. This applies to most cuttings.

Health and Figure Culture.

[Miss J. HASTING, O'Loughlin Branch.]

Very few women have perfect physical development; they are either overweight or too thin. The overweight woman can easily reduce her surplus fat by taking daily exercises such as brisk walks mornings and evenings, climbing, bedmaking, etc. While making beds, the "daily dozen," shake every sheet, blanket, and quilt, as this is exercising the lungs. Try to touch the floor with your finger tips every morning and evening without bending your knees. Have palms facing each other and hands should be same width apart as shoulders. This may seem hard in the early stages, but soon you will touch the floor without any difficulty. Another good exercise is: Raise the knees alternately as high as possible and keep the body perfectly erect while raising the knees. These exercises should be done 8 to 15 times without a break.

Exercises are not merely slimming, but also a foundation to health and beauty. Some people declare that physical exercise is not necessary to health. It is because they have never practised it, or if they have, only once, the result being they feel stiff. This is a foolish excuse of some young girls or women. Women who have reached the age of 60 years have still quite supple limbs only through taking physical exercises. Scientific exercise is absolutely necessary for the enjoyment of perfect health.

Here are a few dietary hints:—On rising a glass of hot water or lemon, apple or grape fruit. For breakfast, weak tea or coffee without milk, melba toast; at all meals, brown bread. White bread should never be eaten. A dry biscuit such as Vitabrit, bush biscuit, Saos, any fruit, fresh and raw. If the fruit is stewed, it should contain no sugar, as all fruits already are sweetened by the sun. Any of this could be eaten for breakfast and a soft boiled egg, or poached occasionally. For luncheon and dinner:—Any meat can be eaten, but should be lean, braized or boiled. All vegetables:—Green vegetables, preferably silver beet, spinach, and lettuce are very healthy vegetables. Potatoes are only meant for thin people. Clear soups, such as mutton and chicken broth, or fish soups with vegetables, are also a slimming food.

Cleanliness is a great source of health. A warm bath is recommended in preference to a cold one, especially for the purpose of cleanliness. Cold baths have a tendency to harden the skin and make it rough, especially so in cold weather, but in summer the cold bath is very refreshing. Do not bath immediately after a meal. Do not bath when exhausted or fatigued. Do not remain too long in the bath. After the bath use a towel vigorously to dry the body thoroughly, and carry out a few breathing exercises.

Sauces, Pickles, and Chutneys.

[Mrs. A. Kloeden, O'Loughlin.]

Pickles have very little food value, and eaten in large quantities can be harmful to digestion, but they serve a purpose in adding zest to all manner of foods, especially when appetites are jaded, besides providing frills to every-day fare. Success can only be obtained by using good quality fruit, fresh vegetables and good vinegar. Good sauces can be made from tomatoes, apples, plums, etc.

The method of making tomato sauce is to boil tomatoes onions, apples and vinegar for 1 hour, strain through a wire gauze strainer, put on to boil again with spices tied in muslin bag for another 2 hours. There are several varieties of pickles—mustard and clear vinegar pickles. All vegetables should be cut up in small pieces the night before, and salt sprinkled over them. Next day pour boiling water over them and drain well. Boil vinegar, mix mustard, flour, and tumeric with a little cold vinegar and pour into boiling vinegar. Let come to a boil, add vegetables and boil for another 15 minutes. For clear vinegar pickles, boil vegetables 10 minutes; for onion pickles just pour boiling vinegar over them.

The most tasty of all chutneys is tomato and apple chutney.

They take a good bit of preparing, but are no trouble to cook, as they need very little stirring. Cut tomatoes up roughly, boil slowly until reduced to pulp, then rub through colander to remove skins. Peel apples and cut up finely, add other ingredients. Tie spices in muslin bag, boil for 2 hours. Pickles and chutneys are much nicer put into small containers than in big jars, as once the air gets to them they are apt to go mouldy on top.

A copper pan can be used for jam making, but never on any account use copper for vinegar preserves. Fears concerning aluminium have been proved groundless, and it is quite as good as an enamel lined pan. Use a wooden spoon to stir for preference.

Conference at Pinnaroo.

The Annual Conference of Pinnaroo Line Women's Branches was held at Pinnaroo on 23rd July—with an excellent attendance of delegates from Parilla, Wilkawatt, Karte, Parilla Well, Parrakie and Pinnaroo.

Miss E. Campbell of the Education Department addressed members on "Balanced Diets," and the following papers were read and discussed:—

Invalid Cookery.

[Miss N. A. Mattiske, Pinnaroo.]

Food for invalids must be nourishing, digestible, well cooked and well served. Tender roast beef, nicely grilled chops, chicken, boiled fish (if not too rich), oysters, lightly cooked eggs, strong soups, beef tea, jellies and light puddings, may all form part of the diet. Milk contains all the necessary food constituents, and is therefore a perfect invalid's food if perfectly fresh, but it is sometimes found rather heavy if taken by itself. Half milk and half soda water, or milk with about ⅛ part of lime water, may then be recommended. Use as little as possible of baking powder, powdered acids and seasoning for invalid cookery. Lemon juice may be substituted for acids and flavourings where possible.

Do not serve warmed-up food to an invalid. Everything but broths should be freshly cooked. Do not leave food of any sort in a sick room, and be careful to exercise the most scrupulous cleanliness. Serve everything in as dainty and appetizing a way as possible. Materials must be of the best quality, and in the case of eggs, milk, meat and fish—perfectly fresh. As great a variety as possible should be provided, and the manner of preparing it the simplest. Always have some kind of food to offer when required. Do not overseason, as a patient's taste is very sensitive. Punctuality and tact are two important virtues in a sick room. Never offer the same kind of food in the same manner, if once refused.

To Sterilize Milk.—For immediate use—Put into a double boiler, heat until scum forms over top; then keep at that temperature (about 190deg. Fahr.) for 1 hour. Do not let it boil. Place in a vessel that has itself been sterilised by being boiled in water. Cool quickly by putting the vessel in cold water. Cover up, if not wanted for some hours, for, if exposed to air again, all the work will be undone. Cotton wool is a good thing to cork it with, and acts as a strainer for bacteria.

Clear Barley Water.—1oz. barley, 2 cups water, 1 dessertspoon sugar, lemon juice. Put barley into a jug with lemon juice and sugar. Pour over the water (boiling). Cover, allow to stand until cold. Strain and serve in a small tumbler.

Thick Barley Water.—2ozs. pearl barley, 1 cup cold water, 1 quart boiling water, lemon rind. Wash barley, put into a saucepan with water and lemon rind. Boil gently until reduced to half. Strain, sweeten to taste, add lemon juice if liked. Serve in a small tumbler.

Beef Tea.—½lb. lean steak or beef, ½ pint cold water, ⅛ teaspoon salt. Remove all fat from the meat; shred finely across the grain, put into basin with the salt, and cover with water. Cover with muslin or a lid, and allow to stand ¾ hour, or until liquid is a reddish colour. Place in a double saucepan and allow to slowly heat, but not boil. Serve in a hot cup with snippers of toast.

Raw Beef Tea.—¼lb. beef, ½ cup water, lemon juice, salt. Remove all fat and shred meat finely across the grain. Put into a basin. Add water, lemon juice and salt. Cover and allow to stand 1 hour. Strain and serve in a coloured glass.

Egg Flip.—1 fresh egg, 1 teaspoon sugar, nutmeg, 1 tablespoon sherry, 1 gill milk. Separate the white from the yolk of egg, beat the yolk with sugar, then add milk and sherry, then the stiffly beaten white. Mix well, pour ino a glass, sprinkle with nutmeg before serving.

Barley Beverage.—3 tablespoons barley, 2 tablespoons sugar, juice 2 oranges, juice 1 lemon, 6 cups water. Wash barley, place in a large vessel, add sugar and rind of lemon and oranges, pour over water (boiling). Cover and allow to stand until just cool. Strain, add juices and place on ice until very cold.

Sago Cream Soup.—1 cup each broth or beef tea, and milk, yolks 2 eggs, 1 dessertspoon sago, salt, cayenne. Soak sago in broth for ½ hour, then cook gently until clear. Cool off. Beat yolks, add milk, then the cool broth. Put into a double saucepan and cook over boiling water until it coats the spoon, but it must not boil. Season to taste. Serve very hot with snippers of toast.

Tapioca Cream.—1 tablespoon tapioca, ½ pint milk, 1 egg, vanilla, 1 tablespoon sugar. Wash tapioca and soak in milk for 1 hour. Place in a double saucepan and cook slowly until the tapioca is clear, then add the beaten egg and sugar. Cook a few minutes longer, add vanilla, turn into a mould to set.

Light Bread Pudding.—1 cup milk, 2 eggs, 1 tablespoon breadcrumbs, 1 dessertspoon sugar, essence. Boil the milk, pour over crumbs, add sugar, yolks and essence. Add the beaten whites of eggs. Pour into a greased pie-dish. Bake in a very slow oven until set. Serve either hot or cold.

Stewed Chicken.—Chicken, white stock, milk, salt, pepper, 1 dessertspoon flour, parsley. Cut chicken into small pieces, place in a saucepan. Cover with stock and milk, and simmer gently until tender. Lift on to hot dish. Strain the sauce, return to saucepan with the blended flour, and stir over fire until it thickens. Add salt and pepper. Pour over chicken and sprinkle with finely chopped parsley. Serve at once.

Steamed Whiting.—Whiting, half-pint white sauce, chopped parsley, slices lemon, carmine colouring. Fillet the whiting, wash in salted water Grease a tin, fold fish in half, skin side down. Sprinkle with salt and pepper. Squeeze lemon juice over, pour a little water into the tin. Cover with greased paper. Bake in a moderate oven until fish is cooked. Make the sauce and colour a pale pink. Lift the fish on a hot dish and pour the sauce over. Garnish with finely chopped parsley and thin slices of lemon.

Calf's Foot Jelly.—Two calves' feet, 2½ pints water, juice 2 lemons, 4ozs. sugar, 8 cloves, small piece stick cinnamon, shells 3 eggs, 3 tablespoons sherry. Wash the feet, cut across through hoof. Place in a saucepan, cover with water and bring to the boil. Pour water off, add the 2½ pints and allow to simmer gently 5 to 6 hours. Strain. Stand overnight. The next day it should be quite firm. Remove all fat and then wipe with hot towel, dipped in hot water. Place jelly in saucepan, add lemons, cloves, sugar, cinnamon and egg shells which have been washed and crushed. Whisk until it boils, draw saucepan to one side and allow to simmer for 10 minutes. Pour through prepared warm jelly bag, add the sherry. Pour into wetted mould and leave to set.

Hooked Rug Making.

[MRS. E. TESCHENDORF, Pinnaroo.]

So much has been written about the making of hooked rugs that I do not know if I will be able to give any fresh hints on the subject.

There are many different methods of rug making, but the method I use is to pull the strips of material or wool held on the underside of the canvas into loops on the right side. The loops will not pull out, as one loop lies so closely against the other that it is quite difficult to pull the material out when it is cut.

I prefer rug canvas for my rugs. Good hessian can also be used, but strong foundation is necessary for a work that takes many thousands of stitches to complete, and will last for many years. For making rugs with worn or new material, the white canvas marked off in squares with blue threads is usually favoured. I generally use fawn coloured canvas; the squares on it are marked in brown, and it is of a slightly smaller mesh. The canvas can be had in various widths. The cut ends must be turned under about 2in. See that the holes in the hem correspond with the upper surface, as the material is worked through the double canvas at the hem.

Hemming by the sewing machine is quicker and better than that done by hand. The canvas can be bought with the design drawn on it; this makes it more expensive. A simple design can be drawn direct on the canvas—first with coloured chalk, which is easy to rub out for any correction, and after the design is correct, with oil paint greatly diluted with turpentine or kerosene.

Dye or water colour will do, but whatever is used, be sure that it will not rub out, for if you cannot follow the markings, there will be much trouble in getting the pattern right. It is best to do some simple design for a first attempt, and if a good colour scheme is chosen, it is often more effective than a more complicated one. For a more elaborate design, make a small scale drawing—say ⅛ of the size—but be sure that it is kept exactly to scale. Then colour it with oil paints; this is easily rubbed out and other colours substituted until the colour scheme is satisfactory; also the placing of the various patterns that go to make the design.

Then take a piece of brown paper exactly the size of the rug—half the size if the pattern is a balanced design—in some cases as little as quarter of the size can be used, but care must be taken to make the pattern join correctly. The design is copied full size on the brown paper, and when quite correct, cut out as a stencil.

Be careful to have the corners of the pattern fit exactly on the corners of the canvas. Pin down carefully then stencil on to the canvas with diluted paint. If you have the selected colours, can be stenciled on to the rug. If preferred, one colour will do.

Sometimes leaves and flowers are cut from stiff paper and placed on the canvas and drawing the edge, which is an easy way to get them all the correct size. For working the rug, I use a hook made of fencing wire with a short wooden handle that fits comfortably in the palm of the hand.

The material for working the rugs should be woollen, or a mixture of silk and wool will do. All knitted material should be cut round and round the way of the knitting. The width of the strips of material will depend on the thickness of the material and the mesh of the canvas. Every hole must be filled fully. The strip of cloth should be drawn through comfortably and firmly, so that no looseness shows on the back of the canvas. If this is done properly, the back will look almost as well as the right side. Cotton material may be used, but it should not be clipped as it will fray, and great care must be taken to have each loop the same size. All the ends of the material must always be drawn through to the right side, and the beginning of the next strip in the same hole. Always outline the design first before filling in the centre. For example: when doing a leaf, outline it first, then do the veins, if any, then fill in the rest with any shading desired.

Outlining the design with black or any dark colour always looks effective. For working the outside row, make the loops double the length of the rest. This gives the effect of a short fringe. If desired, a fringe of either string or wool may be put on the ends. It is advisable not to clip the rug until certain that the working is satisfactory. Turning the rug the wrong side will show if all the lines are right, and if not, the long ends are easily pulled out and can be used again; but after clipping, it is tedious to pull them out, and they cannot be used again.

A USE FOR SHEEPSKINS.

It is often difficult to get enough material of one colour for a background. Sometimes a mottled effect can be secured with two shades of material. After using all the old material in the home and all that can be obtained from friends, I tried using wool.

I purchased skins of long woolled sheep, tore the skin into small pieces and washed out all the grease, then dyed it in a boiling dye. This latter point is most particular, otherwise the colour will not be fast. Being dyed on the skin, the wool does not mat, as it would if it was cut loose from the skin. After drying, cut the wool from the skin, then twist it into strands about 12in. long. It can then be worked into the canvas like any other material, and when clipped, has a lovely soft effect.

I like the appearance just as well as when done with spun wool, and having acquired a spinning wheel, can use fleece wool for spinning; it is much quicker, which is a consideration on a farm. After making, clip it with sheep shears, then brush it with a scrubbing brush that has been well softened by use. Any ends that stand up higher than the other, are cut off. Do not leave the pile longer than ¾ inch when clipped. After clipping and brushing, press the rug on the wrong side, using a damp cloth and hot iron with plenty of pressure.

Another method of rugmaking is that done with the Rapid Rug Machine. For this method, a frame is needed and the hessian or sugar bag is stretched tightly on the frame (sugar bag seems to be the best material to work with). The design is drawn on the back of the rug and it is also worked from the back. Rug wool or strips can be used in the machine. It is best to finish any difficult design or awkward corners with a hook, working from the right side; also the outer edge should be done with a hook, because longer loops can be made in this way.

The loops made by the Rug Machine are all of one length, and when the rug is finished and clipped, its appearance is practically the same as a rug done with a hook. The rug machine may be bought for a few shillings at many of the city shops.

When Eggs and Butter are Scarce.

[MRS. G. PEARCE, PINNAROO.]

Most housekeepers at one time or another have experienced difficulty in obtaining eggs and butter for cooking purposes.

Beef dripping and lard in equal quantities, make an excellent substitute for butter, or even beef dripping alone. If only mutton dripping is available, prepare for use by melting, add a little lemon juice, and beat until firm again. Cakes made without eggs usually contain spices or treacle; therefore dripping is very satisfactory to use in them.

Buttermilk or sour milk and soda are in many recipes the only ingredients used for rising. In such recipes, sweet milk may be successfully used, but, in that case, a little cream of tartar added with the flour is an improvement. In winter, when eggs are less plentiful, these cakes are more appreciated than in summer, as also are the more fruity puddings made without eggs.

TESTED RECIPES:

Soda Cake.—1lb flour, ½lb. brown sugar, ¼lb. dripping or butter, ½lb. currants, 1 teaspoon soda in 1 large cup milk. Bake 1 hour.

Ginger Cake.—Take 1 teaspoon each bicarb. soda, allspice, and cinnamon, and 1 dessertspoon of ground ginger, then add 1 cup each of sugar and clarified dripping and half cup golden syrup. Pour in 1 cup boiling water and mix again; then add 3 cups flour. Bake about 40 minutes in a flat, greased tin.

Eggless, Milkless and Butterless Cake.—Boil together for 5 mins. 2 cups white sugar, 2 cups water, 2 heaped tablespoons dripping and 1lb. sultanas or seeded raisins. When cold, add 4 cups flour in which are sifted 1 large teaspoon soda, 1 teaspoon each of allspice, cinnamon, and nutmeg. Mix well. Bake 1¼ hours in a moderate oven.

Sour Cream Cake.—1 cup sour cream, 1 cup sugar, ½ cup currants, 1 teaspoon each soda, and cinnamon sifted in 1½ cups flour. Mix in the order given. Bake in a well-papered tin for 1½ hours.

Buttermilk Cake.—2 cups each sugar, chopped raisins, and buttermilk, ½ cup dripping (or butter), 4 cups flour, 1 teaspoon each of cloves, cinnamon and nutmeg, 2 teaspoons soda.

Jubilee Loaf.—1½ cups self raising flour, 1 dessertspoon butter, 1 tablespoon castor sugar, 1 cup sultanas and currants mixed, a little lemon peel, a pinch of salt and a little more than ½ cup milk. Bake ½ hour and while hot, pour over top 2 tablespoons icing sugar mixed with hot water and sprinkle with cocoanut.

Soda Pudding.—2 tablespoons dripping, 1 cup each sugar, and currants, 1½ cups each, flour and milk in which is dissolved 1 teaspoon soda. Steam for 2½ hours.

Plum Pudding (Eggless).—¾lb. flour, 1 teaspoon each soda, and cream of tartar, ½lb. each treacle, sultanas and currants, ¼lb. mixed peel, 1 cup sugar, ½oz. mixed spice, ¾lb. suet. Mix with milk—not too stiff. Boil in a cloth 4 hours.

Delegates at the Women's Session of the Upper North Conference at Eurelia on 15th July, 1936.

The Selection and Giving of Gifts.

[Miss M. M. Foal, Parilla.]

There are many things to be considered when buying a gift. First, the taste of recipient should be considered. If one cannot afford expensive presents, give something small and of good quality.

The Twenty First Birthday.

For a girl's twenty-first birthday, gift evenings and wedding presents, there is a very great range of gifts to choose from. For instance, there are very few girls—even though some may not be getting their glory box together—who would have not some idea of the colour scheme they would like to carry out. Therefore, it would be better to try and find out what that colour scheme is, and buy a gift to suit. Nowadays kitchen goods are made so attractively in all colours, that it would not be wise to buy one of these articles in case it did not harmonise with the colour scheme. If not sure of these points, it is far better to avoid anything coloured, or else buy something in neutral tonings that will tone in with most colours.

Should the gift be glassware, let it be nice, fine glass; should it be of the heavier class, let it be clear cut glass. A number of her friends could between them give her a pair of cut-glass salad bowls or a jug and tumblers. One large, good present is much better than several smaller ones. It is not advisable to give presents such as mats, cushions or curtains, unless very sure the recipient will like them.

For the boy, if possible find out what others are giving, so that he will not have too many presents alike. Handkerchiefs, socks, ties, shirts and shaving cream and soap sets never go amiss, but he does not want too many of them. Here again, a number of his friends can club together and give him a good leather kit bag, a set of tools, or a watch. Two or three good gifts like this would be much more appreciated than many smaller gifts.

Presents for Baby and the Children.

Giving to the new-born babe also needs consideration. He is sure to get plenty of bonnets, booties, bibs, woolly sets, &c. Why not give him something he will want later on and mother will have to buy, such as baby powder and soaps. A very practical gift would be two or three yards of baby flannel, fuji or wincey, which the mother can make up when he is a few months older and will want it. These gifts will be much more acceptable, as mothers know that few babies use all they have given them at birth.

Should the gift be to a child of school-going age, give something useful as well as attractive; something that will help him on with his education. If fond of reading and not of writing and is inclined to avoid work, give a book and a set of pencils. This will encourage him in this direction, and if he is inclined to be backward with his reading, give a very interesting book and tell him it is interesting. He is sure to read it. Should it be a little girl, something in the sewing line may be more appreciated.

The following is a description for a colour scheme; it may help any young girl to work out her colour scheme, or help with giving presents in keeping with a colour scheme—have both kitchen and bathroom green and gold, because it is so clean and fresh looking and lends a cool atmosphere during the hot summer months. Green and gold towels can be used in both rooms and would not break the colour scheme. A dining and sitting room in autumn colours, in any chinaware is used in the kitchen, it would go well with the green and gold. For a bedroom, deep shades of pink look cosy and warm, and one can buy lovely shades in mats and carpets which make a colour scheme complete.

Dahlia Growing.

[Mrs. F. N. Atze, Karte.]

No flower lover who delights in a garden can afford to be without a dahlia supply of some sort. These magnificent summer and autumn flowering plants are not difficult to grow and for years have been recognised as the most popular autumn flowers. Dahlias favour fairly rich, deep soil of a loamy nature, but give a good account of themselves on most garden soils. If the soil is rich, it will not be necessary to manure it until the first buds appear, but if it is poor, it should be prepared during winter by digging in a plentiful supply of well rolled stable manure. Lighten heavy soil with well decayed horse manure, leaf mould, or garden litter and sand. If sandy ground, then make it more retentive of moisture and more sustaining to plants by adding animal manures (cow for preference) leaf mould or any similar material that will add humus. In both classes of soil, commence operations with a lime dressing before adding the manure, each time turning the soil, but never lime and manure at the same time. Eventually incorporate some Bone Dust at the rate of about 3ozs. to the square yard. The land must be well drained. Dahlias delight in a sunny position, but must have shelter from strong winds, otherwise they suffer serious damage. Tubers may be put in at any time from September to January.

Growers keen on exhibiting their blooms at shows, plant dahlias in December, in order to obtain the first and better blooms during the first week in April, but the flower lover not interested in shows, need not wait until April for blooms. Earlier planting in October-November will result in beautiful blooms being produced from December onwards until frosts call a halt. Intensive heat, such as is sometimes experienced during a heat wave, damages summer blooms, but the plants suffer no damage, and in spite of scorched blooms will, when these are removed, quickly respond with others that may be enjoyed during cooler days. Reserve some bulbs for December planting, but do not forego many added weeks of pleasure which are possible from earlier plantings.

Plants must be carefully staked from the beginning; they are very brittle and unless well staked, will be broken down by strong winds. It is important to give them support as soon as they are a foot to 18ins. high. In planting tubers, they should be put in with the eye facing up; in sandy soil 4 to 6in. deep, in heavy soil 3 to 4ins. It is important to keep the soil well stired to prevent caking and evaporation. When the main stem is about foot high, pinch out a few inches from the top and force side growths, choosing 3 strong ones and removing the rest. Tie the three main laterals to stakes, as they grow long enough to need support. If extra large blooms are desired, remove all shoots except the ones carrying the crown bulbs. By the time the first crown buds have produced blooms, plenty of other lateral shoots will appear lower down on the main stems, and these will keep up the flowering for a considerable period. When the first buds appear, the ground should be well mulched with stable manure, and the plants given plenty of water. This will avoid the necessity for liquid manure.

Dahlias are thirsty subjects and must be watered overhead as well as at the roots. They enjoy the washing down of the foliage immensely after a duststorm, but is must be done in the cool of an evening. Dahlias need to be kept moist, but not saturated. Over-watering produces a soft, sappy growth that wilts on every occasion of heat. Aim to keep the plants hard and dark green in foliage. Give them a thorough soaking once a week when they become established, but do not be constantly watering them. Excessive manuring forces them to soft growth which is easily broken and never produces the best blooms. It is important that all spent blooms be cut before they have a chance to seed, right to the bottom of the stalk. After the foliage and stems have died off in winter, the tubers should be carefully lifted and stored in a cool, dry position until spring; under a leafy tree or shrub is a good place, but away from frost. They should be inspected occasionally, and when new shoots appear, the clumps should be carefully divided with a portion of the stem attached to each tuber and replanted.

Dahlias are divided into many classes, chief amongst which are Decoratives, which produce enormous blooms on stiff stems, the centres of the flowers are full and do not show the pollen-bearing organs until the blooms are far past their prime. Peony dahlias are similar to Decoratives, but have short, curling petals around the central disc. Collarette types have a single row of ray florets with a second row of shorter petals forming the collar. The Cactus varieties are formed like so many long spider's legs, curling or whorling in quaint fashion. Show dahlias are the old-fashioned types that resemble honey-combed turnips. Pompoms are similar only much smaller. In Charm dahlias there is now a very large variety; they are really Miniature Decorative, Peony, and Cactus, both formal and informal types. Then there are the Star, Single, and Orchid flowering dahlias, all of which have their admirers. Every type of dahlia produces a variety of colours and markings not excelled by any other flower.

Some of the Many Ways of Using the Half Sheep to the Best Advantage and the Different Cuts without Waste.

[Mrs. R. J. Billing, Parilla Well.]

The head can be boiled and potted for use when cold, or served hot with egg sauce. The brains are dipped in egg and bread-crumbs, then fried, or done in white sauce as for oyster patties. The liver is usually cut in pieces, rolled in plain flour, and sprinkled with salt, pepper and dry mustard; then fried carefully with bacon, or a little onion. Serve with brown gravy.

Boil the neck and shank and remove from stock, which is to be kept for soup. When the meat is cold, mince it for a potato pie. Cut off the shoulder with a fair margin, and bone it for stuffed shoulder, which is baked, or boiled and served with caper sauce. The neck chops can be used for Irish stew or haricot.

The cutlets are nice if trimmed, then dipped in egg and bread-crumbs and fried. Arrange cutlets on a dish of mashed potatoes and serve very hot. The breast of mutton, if boned and rolled with some seasoning, tied well and baked, can be used either hot or cold. It can also be boiled until tender, then the bones removed and sprinkled with bread crumbs which have been browned and seasoned with pepper and salt. This stock is useful for soup, if it is strained and the fat allowed to set.

The loin is very nice if baked and served cold, and is recognised as being among the best cuts in mutton. The loin can also be used as chops, fried, grilled and braised and served with brown gravy.

If the leg is boned, stuffed and baked, it is very nice and goes further than when baked plain. If a smaller joint is wanted, the leg can be cut and the part which is fattest, baked. The lean can be boiled and served with parsely sauce and boiled onions. This part is also nice minced for rissoles, meat rolls, pies and pasties, if cut into small pieces.

Slices cut from the old leg of meat when under-cooked and dipped in frying batter, helps to use some of the left-over meat.

Entertaining Children.

[Mrs. Daphne Trowbridge, Karte.]

In the pram the child soon requires something to hold and play with, and this should be given so that the little one can strengthen his fingers and arms. It will not be long before he will be throwing them out, so care must be taken in case he leans too far over the edge to retrieve his favourite toy. As a safety device, use shoulder staps. These can be made quickly, daintily and inexpensively. For a knock-about pair, use stout, fadeless, coloured fabrics; for a gift pair, calico can be used for lining to a fuji or bemberg silk pair, working tiny sprays of flowers with silks; or for a boy work a tiny animal or bird. An inexpensive pair of straps can be cut from sugar bag or hessian, strips cut 2½ins. wide, ¼in. for turning, then fold in half and press, making straps 1in. wide. The circular strap around baby's waist is 24ins. long, straps over shoulders 11½ins.; front cross strap 7ins. back cross strap 6½ins. hanging side straps 14½ins. These measurements allow for 1 inch at the end to tuck in where the straps are joined.

The child of 18 months loves to climb stairs, and to reach up for objects, to climb on boxes, fences or rails. He can throw a ball and run after it and loves to scribble and make marks with a pencil or to build blocks and knock them over. If parents do not provide the opportunity for children to do things such as these, they are retarding their development to that extent, and are encouraging the climbing on chairs and tables, and scribbling on walls and books. Even at this early stage, the child needs a place of his own. It need not necessarily be a room, a corner of a verandah will do, or somewhere to place his treasures and call his own.

In the garden he should be encouraged to climb, run, push and pull toys, and in every way exert his growing strength and to educate his muscles. When a toddler comes into the kitchen demanding entertainment, try the method of providing education at the same time. A set of canisters or saucepans will amuse a child for an hour. Take off the lids and mix them up, and allow him to fit them on correctly. He will probably repeat the performance many times. Next let him arrange them in steps, in order according to size. When he tires of this game, show him how one will fit inside the other.

Then a toddler usually loves to sort the spoons, forks and knives, and place them in their respective compartments. All these occupations are really exercises for training the eye and judgment. On a warm day in summer, let toddler have a bucket of clear water, a jug and a variety of containers. He will spend delighted hours pouring, lifting, and emptying. The result will be seen in his ability to hold and carry the vessels full of liquid without spilling a drop.

TRAINING AND ENTERTAINING.

It is well to remember "Never do for a child that which it can do for himself." Mother should show toddler how to lace, tie and button, and then let him do it himself. It may be many days before even one is mastered, and there will probably be many muddles, but one day he will succeed, and it will be a proud and happy fellow who will soon be able to dress himself. Besides being good training for the child, it is a boon to any busy mother.

Any one of us may be polishing a floor, and a young child, seeing one in such a position, would readily rush up and try and play "Gee-Gees". I have been in this predicament, and know which one will tire first of the game—the horse or the rider. Try and take the child's mind off the game by giving him a duster to help. Many discourage their zest for work rather than have them about whilst one is working. This is a mistake; many a mother's bigger jobs can be made lighter by the little one who really delights in his little daily tasks. He can take out the mats, until the rooms have been swept out, and then replace them. It will not take long to impress upon him that each one must lie straight in its own place. When sweeping, the dust pan can always be in place, and the chairs and table legs dusted.

Of course, the little ones like their toys and pets. Pet keeping, properly supervised by a parent, helps to mould a kiddy's character by giving a responsibility for the pets and increasing general knowledge.

When a mother of young kiddies is faced with a rainy day, and their demand, "What can we do now?" turn the inconvenience of a day indoors to good account by giving them something to make—something to interest them, something to train clumsy fingers in deftness. Every kiddie loves a scrap book. Perhaps one a little older would like some stiff brown paper to cover the cookery books. It adds much to a child's delight to see something she has made being actually used. Modelling is always popular; also colouring pictures. Used matches coloured with a fast dye are very attractive, and amuse a small child making things by using different colours.

"The Rainy Day Box" is a good idea. When a child gets new toys the old ones are usually pushed aside. Collect all discarded toys and put them out of sight in "The Rainy Day Box." Sometime later—it may be months and months, but usually on a wet day, when their toys become tiresome—bring out the box, and the toys will be popular once again, just as if they were new.

· "Playing Ladies" is a good game for meal times when she will not eat her vegetables. It also gives a splendid chance to improve a child's diction. Before the play starts—for kiddies do not like a game interrupted—impress on the child that ladies speak very nicely, using low pitched voices and sounding "ings." Kiddies invariably begin by speaking in high pitched voices in an exaggerated manner, but it does not do to laugh; just explain again quietly what is wanted. Children respond more kindly to the "play-way" than to direct teaching. Toys can be made from old tins, boxes, &c. What more does a little girl want for her doll's house than tables, chairs, beds, and cupboards made from match boxes?

Here is an idea for a chest of drawers. Take 10 match boxes and glue together, 5 on each side. Paste strong brown paper over the top and sides, lacquer, and complete with brass paper fasteners for knobs.

The entertaining of children depends largely on the nature of the child, and we should find out what he or she delights in most.

Good Pastry Makes Good Tarts.

[Mrs. A. Sumsion, Wilkawatt.]

Tarts of all kinds are popular in homes where there are young people. The foundation of all tarts should be good pastry. This, of course, need not be expensive. Pastry is a combination of flour, fat and water. The fat used can be butter, clarified fat, lard or margarine, or a combination of any of them. Clarified fat can be made very palatable by adding to it a squeeze of lemon juice and beating it well until it is creamy.

The moisture in pastry-making can be milk, egg or water. A quick oven is always a necessity when cooking pastry. Tart-filling may be fruit mixtures, custards, or any sweet combinations.

PASTRY FOR TARTS.

Rough Puff Pastry.—½lb. each flour and butter, ½ cup water, pinch salt, yolk 1 egg, juice of lemon. *Method.*—Sift flour, break in butter in small pieces. Add mixed yolk of egg, water and lemon juice; make into soft paste, turn on floured board, and roll several times; then it is ready for use.

Short Pastry.—½lb. flour, ¼lb. shortening, pinch salt, juice of lemon or teaspoon of vinegar. *Method*: Sift flour and salt, rub in shortening, and mix well with liquid until it forms a ball and leaves the side of the basin clean. Turn on to floured board, and roll out as required.

Pastry for Black Currant Tarts and Cherry Tarts.—3 tablespoons butter, 2 dessertspoons sugar, yolk of 1 egg, ½ cup each plain and cornflour, 1 teaspoon baking powder, a pinch of salt. *Method*: Beat butter and sugar to cream, add egg and other ingredients. Roll to wafer thinness, cut to shape, and bake for about 7 minutes in a quick oven; fill when cold.

FILLINGS FOR TARTS.

Prune and Lemon Tart.—1lb. prunes, 4 tablespoons lemon cheese, 2 whites of eggs, 4ozs. sugar. *Method*: Line a tart dish with short paste. Stone prunes, and chop very finely. Add the lemon cheese to them, and mix well. Place in pastry and spread evenly. Place in hot oven until cooked a nice brown. Remove from oven and spread meringue (made from whites of eggs and sugar) over it. Place back in oven, and bake slowly till meringue is set and a golden brown.

Lemon Cheese.—1oz. butter, 2 eggs, 5ozs. sugar, 1 lemon. *Method*: Beat up the eggs, add butter, sugar and grated rind and juice of lemon. Put in saucepan and stir over fire until as thick as honey. It will keep for months.

Apple Florentine.—Puff pastry, marmalade jam, apples, sugar, whites of eggs, walnuts. *Method*: Cover a tart plate with pastry. Spread evenly with marmalade jam; then fill with apples finely sliced. Sprinkle with sugar, cover with thin layer of pastry, and bake in hot oven. Cover cooked pastry with meringue, decorate with walnuts, and return to oven until meringue is set. *Meringue*: Beat whites of eggs together until stiff.

Five Twos.—Beat together 2 tablespoons each butter, cocoanut, sugar and marmalade jam and 2 eggs. Cover some small tart patties with a good pastry, and fill with mixture. Bake in quick oven.

Banbury Tarts.—Mix together ½ cup seeded raisins, ¼ cup each currants and sugar, a little candied peel, a little mixed spice, 1 tablespoon of brandy, juice of 1 lemon. Roll out some rich pastry very thinly, and cut into rounds. Place a little of mixture in centre of each, then squeeze edges together, and roll each one with rolling pin. Place on baking slide; sprinkle with sugar and milk.

Macaroon Tarts.—Make some jam tarts by lining a tart plate with a good short pastry and spreading thinly with raspberry jam. Cover jam with a macaroon made by beating egg and 2 tablespoons of sugar together. Bake in a moderate oven.

Inquiries and Answers.

[Replies supplied by Miss E. Campbell, Dip. Dom., Econ., Instructor in Domestic Arts, Education Department.]

Rendelsham: How to clean a white felt hat.

Remove all trimmings and lining, brush well inside and out. The hat could then be washed in petrol, rinsed in clean petrol, and hung on the line to dry. Air thoroughly to remove all traces of petrol and then press lightly. Replace trimmings and brush the hat from the front to the back; never brush from the back to the front.

Another method is, after removing trimmings and brushing thoroughly, rub well with block magnesia inside and outside, being extra particular where the perspiration mark might be at the front of the band. When thoroughly covered with magnesia, roll in a hot bath towel and leave for two or three days. Remove from towel and shake well to remove magnesia. With a very clean brush, brush from front to back and replace trimmings.

Note.—Petrol must never be used near a fire or naked flame. If convenient do petrol work out of doors.

Maltee: What will completely remove lemon syrup stains from silk marocain?

This is really a fruit stain and is held in the material by the sugar of the syrup. If the stained material is held fairly tightly over a basin and hot water poured through from a height, the sugar and syrup will be washed away from the material. It might be necessary to repeat this process several times before the stain is removed.

If the marocain is a coloured one, it is possible that the acid in the syrup has destroyed the dye of the material, in which case there is no remedy.

What will take red ink stains from a tweed frock?

Soak stained portion in diluted vinegar for 10 to 15 minutes. Rinse out the vinegar and repeat until the stain disappears.

Gladstone: A suitable polish for red cement that does not become slippery.

There are several good cement polishes on the market, but it is wise to get a polish which does not contain very much wax. There is a paint for red cement which gives a glossy finish and is not as slippery as polishes, known as Cement Paint. This is procurable at most stores.

What is the best method of cleaning paint brushes that have been used for black ezywurk?

Remove as much ezywurk as possible with paper, then place the brush in an old tin and cover the whole of the brush part with vinegar. Put on the fire and boil for about two hours. Work the brush against the sides and bottom of the tin whilst boiling to separate the bristles. Remove from vinegar and wipe with paper. All ezywurk should come off easily.

Eurelia: Why does food stick to aluminium frying pans when cooking?

It seems to be new, bright aluminium that causes this complaint, and there seems very little remedy until the pan has become thoroughly worn. Whilst the pan has a very bright surface heat a small quantity of fat, about half a teaspoonful; pour this out and wipe the pan thoroughly with a piece of crumpled paper. This is called "proving" the pan. Now put the quantity of fat required for cooking in the pan and proceed with the work.

What will take the paint stains out of a white fuji silk frock?

Carefully scrape off the surface paint, then with a good turpentine rub the stain gently, holding the material over a clean duster. Keep applying turpentine until the stain has practically disappeared, then wash garment in the ordinary way; the turpentine and the remainder of the stain will disappear.

Would it be advisable to boil ham or any corned meat in a copper?

At one time all cooking utensils were of copper, and they were used successfully. It would be advisable to thoroughly wash the ham or corned meat to remove surplus pickle before placing the joint in copper of water. It is not desirable to allow meat to stand in the liquid in the copper until it is cold. The meat could be lifted out into a large basin with a quantity of the liquid, then allowed to become cold. This helps to keep the meat moist and juicy.

Tantanoola: How to clean smoke from curtains without laundering them.

Smoke is small particles of carbon and white ash, and these particles cling very persistently. If they cannot be removed by vigorous shaking, try rubbing the curtains with block magnesia, or sprinkling them liberally with powdered magnesia, or Fuller's earth. Fold and roll tightly in a bath towel and place away for three or four days. Then remove the powder by shaking and brushing. Any other methods would involve washing.

Kangarilla: What is the cause of tomato sauce fermenting after it has been opened a few days?

Care should be taken not to use over-ripe fruit or vegetables. Onions which have started to sprout before using are almost certain to cause fermentation afterwards. Poor quality vinegar has not the preserving effect of a good vinegar.

Should the sauce not have been cooked sufficiently to have given complete sterilisation, then it would be doubtful as to how long the sauce would remain in good condition after being opened.

The bottles must be thoroughly sterilised before using. To have successful sauce, use ripe but firm fruit, vegetables in good condition, good vinegar and strain the sauce through a sieve that will prevent any pieces of skin or vegetable passing through.

Kangarilla: What causes leather chairs to become sticky?

The surface of rexine, which is known as American leather, is simply a paint on a linen or calico foundation. With constant use the backing of the leather becomes stretched and the surface paint does not stretch to the same extent, and it therefore wears and the oil is free to a slight extent. This causes the stickiness.

It is difficult to prevent this, but it can be remedied by using a cloth wrung out of warm soapy water. Thoroughly wipe the leather, it must then be well dried. If the leather has stretched very much and becomes bulgy, paint it over with the white of an egg. As soon as the egg is dry, rub the leather free of any egg, then polish it, using a very little good mop oil or furniture polish. Finally rub well with a dry, soft cloth. It might be necessary to repeat this every three or four months.

What is the reason for cakes that seem perfectly cooked going flat after being out of the oven for 10 minutes?

In this question "seems" is the tell-tale word. If a cake is properly cooked, it has no possible means of going flat.

If too much sugar has been used, the consistency of the mixture will be thin and when the cakes are cooking, the mixture will spread instead of rising, and will have a slight toffee-like surface when cooked. If too much butter has been used, the consistency will appear quite right, but the cake when cooked will have a moist appearance, will break and crumble easily, and if there is fruit in the mixture, this will sink to the bottom.

If very light mixtures are allowed to stand too long before being placed in the oven, the rising works itself out and the cake is inclined to sink in the cooking.

Is Vinegar made from the Vinegar Plant considered a condiment; if so in what strength does it compare with bought Vinegar?

Mrs. J. Sands, of Tailem Bend has supplied the following answers to the above question which was submitted by the Mudamuckla Branch:—

This vinegar is just as good for pickles and sauce, in fact for every culinary requirement as any vinegar bought from the grocer. But it needs keeping a while after it has been bottled. I kept the last that I used for pickled onions 3 months in the bottles and made a splendid job of them.

There is a small fly which sometimes gets around the vinegar jar—these are the vinegar fly and are not harmful; they do not stay around if the jars are tied down with newspaper.

To Make the Plant.

Collect all the juice left over from stewed fruits, such as apples, pears, apricots, peaches, &c., put into a jar with a wide top. Half juice and half water is necessary. As soon as the jar is full, toast some crusts of bread—each end of the loaf will be sufficient—until nearly black and let them float on top of juice and tie down. After about 3 months the bread will have gone to the bottom and a plant grown on top of jar and the fruit juice will have turned to vinegar.

To Make Vinegar with the Vinegar Plant.

Obtain one jar about 2 to 2½galls. capacity and into it put 2lbs. white sugar, 1lb. brown sugar, and 2galls. cold rain water. Stir these ingredients until dissolved and add ½ cup yeast. Then place the plant on top. Tie down. This must be left undisturbed for 3 months. Untie the top and see if the plant has fallen to the bottom of the jar. If so it is time to pour off the vinegar Pour off gently and do not stir up the sediment at the bottom of the jar. Strain the vinegar and boil about 5 minutes and bottle. If it is not clear, let it stand in the bottles and it will settle down to the bottom and become quite bright and clear Set the plant working again, lift out the plant, rinse out the sediment from the jar, put in another sugar, water and yeast mixture as written above and start it working for another 3 months.

White vinegar is made by using an extra lb. of white sugar and omitting the brown sugar.

Chili Vinegar.

Half gallon vinegar, 6 hot chilies crushed, ¼ teaspoon salt. Boil for 5 minutes, strain and bottle.

Worcestershire Sauce.

Half gallon vinegar, 1 cup golden syrup, 1 cup damson jam, ¼lb. garlic, 1 cup sugar, 2 teaspoons ground ginger, ½ teaspoon ground cloves, ½ teaspoon ground mace, 2 heaped teaspoons cayenne, ¼ cup Soy (Indian) Boil half an hour, strain and bottle.

Pickled Melons.

Six pounds melon, 2lbs. green tomatoes, sliced and sprinkled with salt to draw out the water, to be left overnight to drain. Next day put into preserving pan with one quart of vinegar, boil until soft, and then add 1 cup sugar, 2 tablespoons flour, 2 tablespoons mustard, 1 teaspoon ginger (ground), ¼ teaspoon cloves (ground), ¼ mace, and 1 teaspoon cayenne. Mix mustard and flour in cold vinegar and add to boiling melon.

Grassland versus Fallow.

In the course of a paper read at a meeting of the Ungarra Branch on 13th July, Mr. W. G. Gordon pointed out that through long-established practice fallowing had become an institution in this State. Indeed it could be said that a farmer was judged by many people on the presence or otherwise of a respectable area of well-prepared fallow, it being held that if fallow was lacking farming practices were of a precarious and slipshod nature. However, the unsatisfactory and fluctuating prices ruling during late years had led many farmers into seeking to reduce production costs. In the better rainfall districts grassland wheat-growing offered one avenue worth exploiting. On the writer's property 150 acres of grassland broken up early in April had yielded from 18 to 21bush. per acre. The cultipacker had been of great assistance in reducing the soil to a fine tilth. Land ploughed later in the season did not yield so well. While the lower yield was partly due to rust, it was plain that early breaking up of grassland was necessary for satisfactory results. It could not be done if rain was lacking.

JOURNAL
OF THE
Department of Agriculture
OF
South Australia

VOL. XL. SEPTEMBER, 1936 No. 2

Published Monthly by the Department of Agriculture Edited by H. C PRITCHARD

	Page
Activities at Roseworthy Agricultural College, 1935-36	111-123
Reworking Fruit Trees	124-128
Agricultural Practices in the Hills—A Glimpse into the Future	129-133
Tests of Quality Adapted to Hand-Ground Meals	135-140
Egg-Laying Competitions	142-143
Papers read at Conferences	144-159
Frost Prevention	162-165
Agricultural Bureau of South Australia—Conferences	166-167
Rainfall Table	168-169
Bureau Reports	170-195

WOMEN'S BRANCHES.

Bureau Reports	196-203
Papers read at Forty-Seventh Congress	203-210

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1936

Murray Lands (East), at Alawoona, Tuesday, 6th October (Mr. Angus Thomson, Alawoona).

Eyre's Peninsula (Lower), at Yeelanna, Wednesday, 21st October (Mr. R. R. Wilson).

Eyre's Peninsula (Central), at Minnipa, Friday, 23rd October (Mr. H. E. Broad).

Fruit (non-irrigated), at Greenock, Tuesday, 3rd November (Mr. A. Schubert, Greenock).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Eudunda, Wednesday, 30th September.
Laura, Wednesday, 30th September.
Wirrulla, Friday, 2nd October.
Kapunda and Light, Saturday, 3rd October.
Burra Burra, Saturday, 3rd October.
Kadina, Saturday, 3rd October
Mannum, Saturday, 3rd October.
Karoonda, Wednesday, 7th October.
Murray Bridge, Thursday, 8th October.
Cleve, Saturday, 10th October.
Moonta, Saturday, 10th October.
Blyth and Kybunga, Saturday, 10th October.
Wanbi, Saturday, 10th October.
Loxton, Wednesday, 14th October.
Kimba, Wednesday, 14th October.
Colton, Wednesday, 14th October.
Yallunda Flat, Wednesday, 14th October.
Penola, Wednesday, 14th October
Southern Yorke Peninsula (Yorketown), Wednesday, 14th October.
Strathalbyn, Wednesday, 14th October.
Tailem Bend, Saturday, 17th October.
Paruna (Brown's Well), Saturday, 17th October.
Maitland, Wednesday, 21st October.
Pinnaroo, Wednesday, 21st October.
Mount Gambier, Wednesday and Thursday, 21st and 22nd October.
Willunga, Thursday, 22nd October.
Clare, Saturday, 24th October.
Port Elliot, Saturday, 24th October.
Kingston (South-East), Saturday, 24th October.
Minlaton (Central Yorke Peninsula), Wednesday, 28th October.
Tatiara (Bordertown), Wednesday and Thursday, 28th and 29th October.
Yankalilla, Saturday, 31st October.
Millicent, Saturday, 31st October.
Naracoorte Show, Wednesday, 4th November.
Kingscote, Kangaroo Island, Thursday, 5th November.
Mount Barker, Saturday, 7th November.
Woodside, Saturday, 14th November.
Kalangadoo, Saturday, 14th November.
Onkaparinga, Saturday, 14th November.

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Activities at Roseworthy Agricultural College, 1935-36

Part IV.—Cereal Breeding and Experimental Work.

By A. R. Callaghan, D.Phil., B.Sc. (Oxon.), B.Sc.Agr. (Syd.), Principal, and E. J. Breakwell, B.Sc.Agr. (Syd.), Plant Breeder.

There is no phase of College work which calls for so much detailed work and attention, utilises so much labour without yielding monetary returns, and from which results are so slow to accrue than that of cereal breeding and experimentation. In spite of this lack of the spectacular it is perhaps the most fundamental of all functions of the Institution outside the training of students. Unfortunately it is work that cannot, under any circumstances, be rushed, and it is the least satisfying of all to report upon, in that definite, clear cut issues only occur after years of intensive experimentation. The risk of generalising unduly on one or two results is very liable to lead to unjustified conclusions which become subject to criticism and subsequent readjustment. It is not sufficient that a new variety, or a new method, or a new fertiliser, should show promise, as indicated by one or two seasons' trial, but it must be definitely superior to a standard variety or treatment which has already been fully accepted by the farming community, and this superiority must be maintained over at least three years before such can be confidently recommended. There is a wealth of difference, therefore, between a variety that is promising and one that is recommended.

Our agricultural methods are undergoing a gradual transition. The *prima facie* cause is the increasing importance of sheep and the decreasing importance of wheat as a source of revenue to the farmer. In anticipation of the acceptance of mixed farming as a regular practice, experiments which would give sufficient significance to sheep husbandry had to be designed and put into operation. For example, the experiments to assess the relative value of different dressings of superphosphate which gave consideration to the wheat yields to the almost complete exclusion of the residual effect of the fertiliser on pasture had to be re-designed, whereby the pasture values resulting from increased dressings of superphosphate might be more accurately and scientifically assessed, as well as the differing wheat yields from the various plots. Whether, in view of the value of sheep, it was advisable to use the cultivator as rigorously as was necessary under pure wheat farming was another problem calling for solution. It was considered probable that there would be some loss of yield due to neglected fallows, but how much; and would the increased grazing from the neglected fallows recompense the farmer for loss of yield?

Members of the State Committee for the Improvement of the Standard of Wheat inspect the wheat-breeding plots at the College, October, 1935.

These, and hosts of other crucial questions, have been considered by the College over the past few years and experiments have been re-designed and new ideas put into practice in an attempt to solve them.

Likewise, with wheat breeding there was an outcry only a few years ago for varieties of better baking quality. The College, realising the necessity for such better quality wheats, at the outset altered its plant breeding programme and made numbers of new crosses in an attempt to combine that elusive character of baking quality with satisfactory yielding ability. The net result of this radical change of College policy, a change which was largely based on anticipatory developments in South Australian agriculture, which have since been realised, or are in the process of realization, is that most of the experimental work and plant breeding material is yet in its infancy or comparative youthfulness. Results have been obtained certainly, but as a general rule these have been insufficient to warrant the formulation of definite conclusions. In the wheat-breeding plots there is a large amount of material in the third and fourth generations and much of this material is, to say the least, promising, but only those critical tests which will be applied in the coming and subsequent seasons will decide whether these earlier efforts are to be rewarded with the full fruits that the careful and tedious work deserves.

For the present, therefore, reports on this aspect of College endeavours must, of necessity, be of an intermediary nature. Small contributions, it is hoped, will be made from time to time, but those results of especial magnitude cannot possibly be attained for another year or two at least. Valuable information on agriculture and farm management in the broader sense can be, and has been, regularly obtained without specialised experimental work, but those questions which involve a delicate, but all important, margin of profit or loss, can only be answered by an accurate system of testing, continued over a number of years, to embrace all probable seasonal conditions.

Wheat Breeding.

The wheat-breeding plots in the 1935 season attained an unprecedented size, including some 12,000 hand planted rows, each 20ft. long, as well as a large number of drill strips and long rows. The hand plots increased appreciably with the increased emphasis on baking quality. The specific object of combining baking quality with desirable agronomic characters has been previously defined and since then, no effort has been spared to build up a wealth of crossbred material, which, on the various pedigrees included, should contain strains which possess the combination which is sought.

The season was an admirable one, both for growth and for the assessment of such important factors as disease resistance, lodging, shattering and baking quality. The only unfortunate season abnormality, from the plant breeding point of view, was the almost entire absence of flag smut; an unusual occurrence under College conditions. Bunt was prevalent in inoculated material and stem rust appeared late in the season with sufficient virulence to render selection possible for rust resistance under field conditions.

The most valuable component of the season, again from the plant breeding point of view, was the occurrence of a gale just prior to harvest. This caused excessive shattering in the exposed rows of the plots, enabling invaluable selections and observations to be made on resistance to shaking.

The yields from variety trials and drill strips were good, and the grain sample throughout very fair. Individual plants within the hand plots were large, a desirable character, as in adverse seasons insufficient grain is obtained from a single plant to seed the regulation three rows in the following season.

New Crosses made in 1935.—Wheat crosses made in 1933 and 1934 were, in the main, simple combinations between the commercial high yielding, low, quality, varieties and those high quality varieties which possessed at least fair agronomic characters, such as Dundee, Pusa 4, Florence, S.H.J., Dindiloa, Hard Federation, Cadia and the like. A study of the *second* generation or F2 populations of these crosses revealed that some important factors were missing, a development which was not unexpected. Some crosses, for example, showed a predominance of weak-straw types, others shattered excessively, while some were very susceptible to stem rust. By studying the F2 populations *en masse* these weaknesses were noted. The remnant of the *first* generation or F1 seed of each cross was grown in 1935 and the first generation plants of certain crosses which, from the study of the F2 population, were known to lack certain characters, were crossed with either commercial varieties, which were *strong* for those characters, or with other F1 plants of crosses which showed a predominance of plants in the F2 population possessing the characters under consideration.

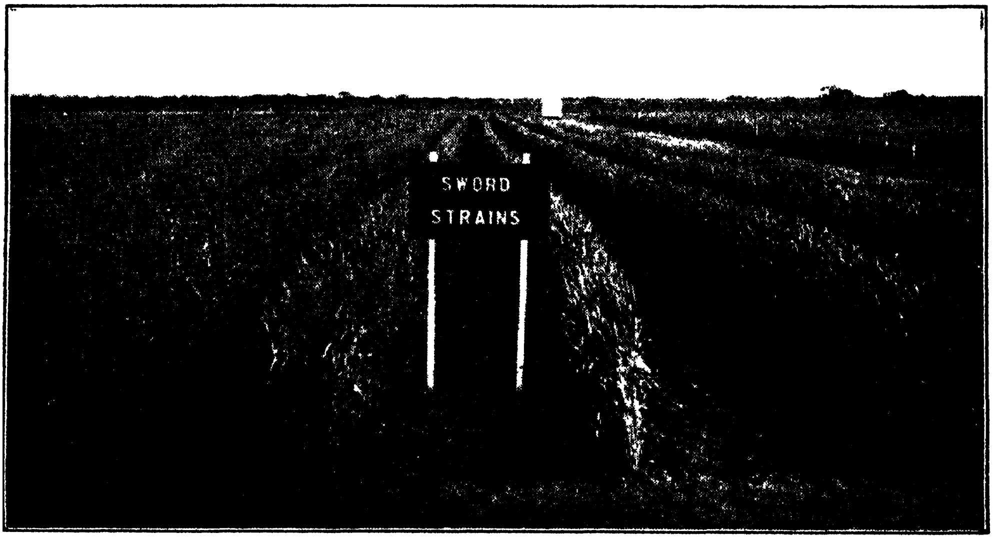
Thus the cross Kenya Crossbred x Ford, while possessing excellent disease resistance, including rust resistance, was considered rather too rank and tall in the straw; it also displayed a tendency to shatter. The F2 population of Dundee x Ghurka, on the other hand, consisted chiefly of short, strong-straw and clubhead types, but nearly all plants showed large lesions of stem rust. Theoretically, therefore, the multiple cross [(Kenya Crossbred x Ford) x (Dundee x Ghurka)] should produce a fair proportion of the desired types.

This method of multiple crossing is by no means new as it was used with much success by Farrer. Many of our important varieties contain four or more varieties in their parentage. The crossing of two F1 plants is, however, less usual; it is scientifically sound, especially when based on careful observations on the F2 populations of the same crosses.

Second Generation Material.—Some idea of the possibilities of a particular cross can be gauged from a study of the population in the second generation, but comments on this material can only be brief. It is sufficient in this report to say that large numbers of vigorous plants possessing good grain and agronomic characters were obtained from most crosses. There were some 70 different crosses in all. A few were rejected outright, the main contributing factor being excessive shattering of all plants.

Third Generation Lines.—Crosses made in the season 1933 were in the third generation last year. As explained in previous issues of this *Journal*, lines in the third and later generations are hand sown, each line extending over three rows. Observations are made on each line and the more desirable of them harvested and tested for quality by means of tho Pelshenke test. Individual crosses are worthy of comment here. The crosses (Baringa x Duri) 3 and (Baringa x Gluyas) 3 were perhaps the most outstanding, and contrary to expectation, many lines from these crosses gave satisfactory Pelshenke figures. Strong straw and the ability to set a large number of grains across, as well as the almost entire absence of shattering, speaks volumes for the dominance of the desirable characters of Baringa. Indeed, this parent, from the point of view of agronomic characters, is proving particularly valuable.

All of the Dundee crosses, likewise, contained some fine looking material, the outstanding cross was (Sword x Dundee) 3, whilst others only slightly less noteworthy were (Ford x Dundee) 3, [(Gallipoli x Sword) 4 x (Dundee)] 3, (Nabawa x Dundee) 3, (Caliph x Dundee) 3 and (Gullen x Dundee) 3; (Riverina x Ford) 3 contained some useful lines, likewise [(Indian F x Canberra) 4 x (Minflos)] 3.



Stud Rows of Sword Wheat. These long stud rows represent the third stage in the programme of pure seed production at the College.

Pusa 4 crosses were disappointing, the lines for the most part being thin and unprolific.

Florence is a notoriously poor parent and it was exceedingly difficult to find a single plant within the lines with Florence parentage which had not shattered badly. Dan is unfortunately very prepotent for its coarse straw, but some handy dual purpose types were present amongst its progeny. (Ghurka x Minflos) 3 was an outstanding cross for prolific short-straw grain types. Observations on F2 also revealed that Ghurka might be useful for breeding, providing sufficient attention is given to baking quality and maturity in the choice of the other parent and subsequent selection.

In all, about 1,300 F3 lines were tested in duplicate by the Pelshenke test, and of these approximately 60 per cent. were rejected on the basis of unsatisfactory quality.

It is not proposed to quote any quality figures in this report, but it might be mentioned that a number of the lines which were outstanding in the field gave a satisfactory Pelshenke number.

Fourth Generation Material.—Only a few of the more advanced crosses have survived the rigorous selection to which they have been subjected over the last three years. A limited number of crosses were made in the 1932 season, but of these the only two which contain lines of promise are (Cadia x Sword) 4 and (Hard Federation x Waratah) 4. The former has amongst its lines one or two outstanding types, somewhat similar to Sword in appearance, but which possess hard vitreous grain. These, for two seasons in succession, have given very high quality test figures. Likewise (Hard Federation x Waratah) 4 contains some good high-yielding lines which have given satisfactory quality figures for two years.

Advanced Crossbred Material.—Brief mention of some of the more promising material has been made in previous articles. During the 1935 season, crosses such as (Ford x Carrabin) 6, (Ford x Merredin) 6 and (Gluyas x Egyptian 4) 5 lived up to their early promise, and lines from each cross, when grown in the crossbred drill strips, proved to be equal or superior to the standard varieties in yielding ability. One line of (Ford x Carrabin) 6, under field conditions, gave a yield equal to that of Sword, and the grain sample, to outward appearances, was excellent.

Lines of (Ford x Merredin) 6 were particularly promising in yield. Of the Merredin type, they might prove to be useful in the drier districts, and their quality is similar to that of Ford.

Strains of both the above crosses are now completely fixed and pure seed is being raised for more extensive testing. It is to be hoped that early maturing types which will take the place of the low quality Waratah will be obtained from these.

The cross (Gluyas x Egyptian 4) 5 shows an outstanding degree of disease resistance combined with quite high yielding ability and moderate to high baking quality. As would be anticipated from the parentage, the straw of all lines is rather weak, a factor which is likely to disqualify them for direct agronomic use.

Lines of these three and of other advanced crossbreds are now in the field trials, and with the installation of up-to-date baking equipment it is hoped that information of more definite nature will be available after the 1936 harvest.

It is quite possible that some useful varieties may be evolved from this advanced crossbred material, but far greater importance is attached to those crosses which have been made more recently. These have been made with more modern objectives, one of which is that of improved baking quality. The fact that there is high quality material already in advanced generations is due partly to chance, for these crosses were made when quality was considered of only very minor importance, if it was considered at all. However, the same element of chance plays a large part even under the most scientific plant breeding methods and it is sincerely hoped that varieties will be obtained from this material which will temporarily relieve the situation. It must not be forgotten that there are now a number of plant breeders in Australia devoting full time in an effort to combine yield with quality. Collectively they are handling a very large number of crosses. No problem, which has confronted Australian wheatgrowers in the past, has been so intensively studied as this one, and if the combination of yield and quality can be effected it must certainly eventuate in the form of improved varieties within the next few years.

Selection within Varieties.—The intensive work being conducted on the varieties Sword and Ford has been mentioned in previous issues of the *Journal*.

The differences in quality of individual strains of Ford which were first observed in 1934 have persisted, and it may now be definitely stated that, on the basis of Pelshenke figures at least, there is a range of quality in the lines. Whether this range will be significant when studied per medium of baking tests remains to be seen. A wide range in maturity and minor agronomic characters also exists, but most important of all is the variation in shattering. This was most noticeable last season, when it was observed that, while some strains lost large amounts of grain in the gale experienced just prior to harvesting, others "shook" very little and one or two not at all. This is a very important development regarding Ford, for its popularity has undoubtedly been jeopardised by its habit of shattering.

Exactly the same remarks apply to Sword and strains have been isolated which are an improvement in quality to the commercial variety, besides holding their grain better. It might be opportune here to emphasise that, even if these strains live up to their early promise, it will be another three years before any seed is available to the farmer.

Developments in Specific Work on the Problem of Improved Baking Quality.—The Pelshenke method of testing for quality was the only one resorted to at the completion of the 1935 season. Some thousands of routine tests were made, and in spite of adverse criticism which has been received from some quarters, the College has yet to be convinced that this method is of doubtful assistance to the plant breeder. The regularity of the test figures for the same lines from year to year and the relatively close correlation between Pelshenke figures and the known baking value of most common varieties carry a great deal of conviction.

The installation of up-to-date baking equipment at the College, however, will satisfy a long-felt want.

Studies of maltose content on crossbred lines made by the Chemist (Mr. A. R. Hickinbotham) which will be reported upon separately, have illustrated that there is a possibility of selection for this character, which is considered to be a most important one. A subsequent survey of common varieties by the Assistant Plant Breeder (Mr. E. M. Hutton) has revealed a wide range in maltose figures and in the future, promising lines at least will be studied for maltose content. Owing to the relative intricacy of the test the numbers studied must necessarily be small.

The wheat breeding programme is now at a most interesting stage. The somewhat tedious foundational work has been completed and at present there now exist numbers of lines which, from a visual study, possess desirable agronomic characters and which have "qualified" by the Pelshenke test. The next three years will see them fixed for type, systematically tested for quality by the baking test, and some results should be available on their field behaviour. Until those three years have elapsed the tantalising adjective "promising" must continue to be applied to them.

Other Crop Plants.

Oat Breeding.—A number of crosses was made between different varieties of oats in 1935. Broadly speaking, the type aimed at is an early to mid-season dual purpose variety which will give good bulk of early greenfeed and recover well after grazing. All of the existing varieties, when grown on the typical limestone soils of the wheat belt of South Australia, appear to be inconsistent and the need for varieties bred and selected *in situ* is rather acute. Considerable care has been given to the choice of parents and it is thought that suitable varieties should be evolved from the combinations made.

Strains of Early Kherson, Sunrise and Algerian have been isolated and are ready for field testing. The Early Kherson strain is taller in the straw than its parent and only slightly, if at all, weaker. Sunrise selection appears to be a handy dual purpose type which gives a greater bulk of early growth than Algerian and thus may gain a place in the late group. These strains have been included in grazing, hay and grain tests this seeding.

Barley Breeding.—Further crosses have been made in an endeavour to combine the malting quality of the two-row barleys with the prolificacy of the six-row types. It is probable that the character for two-row and those contributing to good malting quality are linked, and owing to the difficulty of assessing malting quality in small lots, it will be difficult to break this linkage.

Lines of the cross (Prior x Beavans Special) 4, which are almost fixed, produced grain of outstanding quality and, in addition, on their first appearance in the crossbred drill strips, outyielded Prior. They are less susceptible to threshing and the heads are broader and more erect. The most promising of them have been promoted to field trials. Strains of Prior selected in 1933 are also showing to advantage.

The specially-constructed Stud Plot Stripper harvesting a Stud Row of Wheat, December, 1935.

Pea Breeding.—The obvious aim is for an earlier but no less prolific pea than White Brunswick. Owing to the scarcity of suitable breeding material no new crosses have been made and efforts will be concentrated on selective work within White Brunswick.

Lines within the cross (Early Dun x White Brunswick) 4 are almost fixed, but have not yet been tested under field conditions.

During the present year efforts are being made to obtain a good collection of field peas so that the characters of different varieties may receive comparative study with the object of selecting suitable breeding material. One serious objection to White Brunswick is that the peas of this variety skin and split very easily, and an endeavour is to be made to overcome this difficulty by cross-breeding.

Cereal Variety Trials.

Five trials were conducted with wheat varieties, including three grain and two hay groups.

As is usual, all trials were conducted on a replicated system of randomised plots and Fisher's Analysis of Variance was applied to the results.

Although the plots looked remarkably even in the field, the Standard Errors derived from the various experiments were rather high, a phenomenon probably due to grain shattering prior to harvest.

For the purpose of testing varieties, care is taken to distinguish between late, mid-season, and early maturing varieties, for no trial is fair where early maturing varieties are sown out of season so that they may compete with late maturing varieties, or *vice versa,* where late maturing varieties are sown out of season to compete with early maturing varieties. This expresses a simple truth to which farmers do not pay sufficient attention, for it is fundamentally wrong to sow early maturing varieties too early, just as it is fundamentally wrong to sow late maturing varieties too late in the season.

In most districts of the South Australian wheat belt late maturing varieties find little favour. For the sake of testing out a new selection of Ford and the variety Baldmin a late group trial was run at the College. For the want of a better standard Ghurka was used in this trial. Results obtained were very satisfactory in such an early district, due largely to the late spring rains. Apart from the fact that this trial proved the variety Baldmin to be weak in the straw, highly susceptible to loose smut, and a shy yielder, no information of direct value to the farming community was obtained. The fact that good results were obtained for the third season with a late maturing selection of Ford is, however, of passing interest.

Details of the results of the other trials, together with comments on the component varieties, are given, and will serve the purpose of indicating to farmers how the varieties compared with one another under Roseworthy conditions last season. It is never wise to generalise from one or two seasons' results, but where results obtained in 1935 have fully substantiated results obtained in more than two previous seasons, some idea of the true measure of material worth is obtained. Where this has been so, comments are made to indicate that the variety has proved itself, or is proving itself, worthy of special notice of farmers.

Wheat Variety Trials.

Mid-Season Wheat Variety Trial.—The only disturbing factor in this trial was brought about by heavy winds which exaggerated the tendency of certain varieties to shatter. Those varieties capable of holding their grain well, accordingly were at a distinct advantage. The two varieties Nawab and Sword shattered worst and their comparative yields were depressed. Even so, both varieties gave significant results over the standard variety Nabawa. The data from this trial are given hereunder:—

Results of Wheat Variety Trials, 1935.—*Mid-Season Maturing Varieties.*

Variety.	Bush.	Lbs.	Percentage Yield.
Baringa	38	32	139
Ranee 4H	33	16	120
Nawab	33	4	119.5
Dundee	31	12	113
Sword	30	0	108
Nabawa	27	40	100
Sirdar	25	48	93
Ford	25	44	93
Bencubbin	25	12	91
Sepoy Selection	18	24	66.5

S.E. = 5.2 per cent. Significant difference = 182lbs. per acre.
Significant results in comparison with standard Nabawa are in block type.

Baringa has over the last three seasons given sufficiently good and consistent results to indicate that it will probably find a place in the varieties of the States, especially in districts with an environment comparable with that of the College. Incidentally it might be added that Baringa was an outstanding variety last year in trials conducted by the College on the property of Mr. J. Cass, of Pyap, in the Murray Mallee. It is a variety that holds its grain especially well, is short and strong in the straw, and consequently does not suffer from high winds. Under South Australian conditions it is not difficult to thresh. The grain produced from Baringa is usually bright and plump with high bushel weight. Although not high in baking quality, it possesses special attributes which make it a valuable component in a blend.

Ranee 4H in this trial has again acquitted itself well, and from the experience of the College with this variety, both in the field and in comparative trials, it can be safely recommended as a standard variety for mid-season sowing.

Nawab has already been referred to in Part III. of this report. It is undoubtedly a very reliable dual purpose variety which should be of value in the central district particularly. It should be mentioned that it is susceptible to most diseases and has a tendency to shake out, but in spite of these defects it has surprising vigour on the light soils, and the College has never yet had a poor crop from Nawab.

Dundee has received considerable publicity over the last three years and farmers might well give it a trial. Like Baringa, it is purely a grain wheat which never lodges or shatters. It is, however, very susceptible to stem rust and the grain has a tendency to pinch. Although its baking quality fluctuates considerably under different environmental conditions, reports from millers have, on the whole, been favourable.

Sword and *Nabawa* require no commentary, but *Bencubbin* on its first year's trial has not given satisfactory results and cannot be recommended. *Sirdar* is too weak in the straw and *Sepoy Selection* is very inferior in yielding ability.

Early Wheat Variety Trial.—In the trial of early maturing varieties *Carrabin* rather unexpectedly proved to be significantly superior to all other varieties. This was undoubtedly due to the tightness with which it held its grain. In this respect it was the only variety which was not penalised by shattering. The variety cannot be recommended until further trials have been conducted.

B.I.P. 2903, an introduced strain from Queensland, and *Aussie* were very satisfactory. The latter seems to be quite suitable for early districts, but the former must be tested further before it is even named.

Merredin did not live up to its promise of last year, and consequently must be given further trial before it is condemned or accepted.

B.F.G. 3003, another Queensland strain, was rather disappointing and is definitely inferior to the other introduction *B.I.P.* 2903 mentioned above. *Florence* once again shattered badly under the influence of high winds.

Results of Wheat Variety Trials, 1935.—*Early Maturing Varieties.*

Variety.	Yield per Acre. Bush.	Lbs.	Percentage Yield. 1935.	1934.
Carrabin	**39**	**56**	**127**	—
B.I.P. 2903	**37**	**48**	**121**	—
Aussie	**36**	**28**	**116**	**106**
Sword	**34**	**36**	**110**	**114**
Early Gluyas	**33**	**40**	**107**	—
Waratah	31	20	100	100
Merredin	31	8	99	102
Florence	30	32	97	122
B.F.G. 3003	30	16	97	108

S.E. = 2.35 per cent. Significant difference = 96lbs. per acre.

Significant results in comparison with the standard Waratah are in block type.

Hay Variety Trials.

Trials were conducted with different varieties grouped into two trials, one. the late maturing varieties which were sown early, and the other, the early maturing varieties which were sown late. In spite of great care in the grouping of varieties it is absolutely impossible to harvest the whole of the plots at the right hay stage, consequently some varieties are given definite advantage over others. Because of this impossibility to give all varieties correct and equable treatment the usefulness of results obtained is questionable and for this reason the hay trials will not be continued in the future.

Some results obtained last year were sufficiently outstanding to warrant special mention. Huguenot, and a shandy mixture of Huguenot and Algerian oats, both outyielded all other wheat varieties, and they were the only two plots to give significant differences over the standard used, namely, Ford. Of the two, Huguenot alone yielded 4tons 6cwts. 72lbs. per acre, while the Huguenot and Algerian oats sown as a mixture yielded 4tons 2cwts. 104lbs. These yields are exceptionally heavy, due to the late spring rains and general seasonal conditions which were especially favourable for Huguenot.

Oaten Variety Trials.

Although a full series of trials was conducted the nature of the finishing conditions was such as to prejudice the results unduly in favour of varieties which were not as mature as others when heavy winds swept the fields. For instance, in one group, the earlier maturing varieties, Belar, Guyra and Lachlan, lost a good deal of their grain before the Algerian and New Zealand Cape were ready to strip. To quote the figures from this trial would be only misleading, for taking Algerian as the standard, while New Zealand Cape yielded 113 per cent. in comparison, Guyra yielded 52 per cent., Belar 38 per cent. and Lachlan 30 per cent. Obviously such results are due to some factor, not varietal, and in this case the heavy winds experienced were known to take a very heavy toll of crops which had ripened at the time.

In the particular trial referred to, which was designed to ascertain the best of the later maturing varieties, *New Zealand Cape* maintained its good record under College conditions, where it is undoubtedly the superior of Algerian. Both *Guyra* and *Belar* grew well and promised good results; both these varieties will be given further trial.

The results and observations made on the plots of the early maturing oats revealed *Early Kherson* in a very favourable light, and for mid-season and late seeding this variety continues to be the most reliable oat at College. Of the others tried in this group, *Palestine*, a purely grain oat, gave reasonably good returns, but it is a variety that has no grazing potentialities, and its only use is for particularly late seeding where grazing is not desired. *Gidgee* is also of some promise and always yields an attractive grain sample.

The most interesting results of the year from oats were obtained from a grazing trial. The oats in this case were grazed off twice and cuts were made from randomised sectors prior to each grazing. Unfortunately the second grazing allowed soursobs to gain the ascendancy and further grazing was not thought desirable. The following data were obtained from the two cuts prior to the grazings mentioned.

Grazing Oat Trials, 1935.

Variety.	First Grazing, 26/6/35.		Second Grazing, 22/7/35.	
	Yield per Acre. Cwts.	Percentage Yield.	Yield per Acre. Cwts.	Percentage Yield.
New Zealand Cape	**18.5**	**181**	**17.3**	**204**
Sunrise Selection	**13.4**	**131**	**10.6**	**125**
Early Kherson	**13.6**	**133**	**10.4**	**123**
Fulghum	**12.3**	**121**	9.6	113
Algerian	10.2	100	8.5	100
Early Burt	9.7	95	8.7	102
Lachlan	**8.8**	**87**	**7.0**	**82**

S.E. First grazing = 8.4 per cent. Significant difference = 1.4cwts. per acre.
Second grazing = 8.7 per cent. Significant difference = 1.2cwts. per acre.

Significant results in comparison with the standard Algerian are in block type.

New Zealand Cape is unquestionably a good oat for grazing. Although it has a prostrate habit the bulk of feed obtained, even in the early part of the winter, is greater than that of most other varieties, and in the trials last year it was well ahead of all other varieties tested. Combined with this attribute, its recovery power is well above average, for even after repeated grazings a number of plants in the strips of this variety matured, whereas all other varieties with the exception of Fulghum were killed right out.

Fulghum performed better than the figures indicate. Its recovery powers are exceptional and a considerable amount of grain was developed when the sheep were taken off the plots late in the season. It is a particularly useful grazing oat and might well find a place for this purpose alone.

Of the other varieties *Sunrise Selection* and *Early Kherson* were the best and gave satisfactory results. *Algerian* was disappointing, while *Lachlan* and *Early Burt* were comparative failures.

Barley Variety Trials.

Yield experiments were conducted with both two-rowed and six-rowed barleys.

Results of Barley Variety Trials, 1935.
Six-rowed Group.

Variety.	Yield.		Percentage Yield.	
	Bush.	Lbs.	1935.	1934.
Tunisian	**27**	**12**	**110**	—
Californian Light	**26**	**40**	**108**	**103**
Californian Heavy	25	44	103	102
Roseworthy Oregon	24	48	100	100
Prior x Roseworthy Oregon	**11**	**32**	**47**	**63**

Standard error = 2.49 per cent. Significant difference = 69lbs. per acre.

Significant results in comparison with the standard Roseworthy Oregon are in block type.

It will be seen from the results that there is little to choose between the respective varieties with the exception of Prior x Roseworthy Oregon, which is inferior and has been rejected.

In the trial with two-rowed barleys only two varieties were included, viz., Prior and Prior x Roseworthy Oregon 2. The two were almost identical in yield, and as the latter closely resembles Prior in agronomic characters there is no point in naming it and distributing seed.

Cultivation Experiments.

The necessity for cultivation experiments of the type conducted at the College was emphasised in a previous report (*South Australian Journal of Agriculture*, February, 1936). An endeavour is being made to ascertain whether the farmer can afford to neglect cultivation of his fallows and in their stead use more sheep for grazing. It is assumed that many farmers might unwittingly be losing money through an over indulgence in this practice.

Results from the 1934 experiment were rather surprising in that the good fallow showed an increase of 5bush. and 6bush. on sandy loam and limestone rubble respectively in comparison with the yield from the poor fallow. Results clearly illustrated, moreover, that in seasons similar to that of 1934 the autumn cultivation was the one which farmers could least afford to neglect.

A critical study of the season throws some light on these results. The heavy rains in March produced an abundant weed growth, which on those fallows which missed the autumn cultivation became particularly profuse in spite of heavy grazing. This, no doubt, resulted in an excessive loss of moisture and readily available plant food, a loss which became a critical factor in the early growth of the crop when abnormally dry conditions were experienced in the early winter. The comparative unhealthiness of those plots which had missed the autumn cultivation was seen at a very early stage and, in spite of the splendid finish experienced in 1934, these plots never made up the leeway. In view of the findings from the 1934 Cultivation Experiments the results from those of 1935, based on identical lines, are very interesting.

Cultivation of Fallow Experiments.

Treatment.	Crouch 's A. King 's White.		Nottles C. Ranee.	
	Bush.	Lbs.	Bush.	Lbs.
A. Routine fallow, five workings	37	28	26	14
B. Missed one cultivation in late summer	38	50	21	56
C. Missed one cultivation in autumn	38	32	27	32
D. Missed one cultivation in early summer	35	18	26	50
E. Missed two cultivations— One early summer Two autumn	37	38	26	6
F. Missed two cultivations- One late summer Two autumn	38	38	24	24
G. Missed two cultivations-- One early summer Two late summer	38	46	21	0
H. Missed three cultivations— One early summer Two late summer Three autumn	37	6	19	2

I. Crouch 's A.—(King 's White) S E. = 1.68 per cent. Significant difference = 76 lbs. per acre.

II Nottle 's C.—(Ranee) S.E. = 3.7 per cent. Significant difference = 108lbs. per acre.

It will be seen that, in spite of the fact that the experiment was conducted under strictly accurate scientific procedure, the results cannot be arranged in any logical order. In Crouch's A. the only significantly inferior treatment is that which missed one cultivation in early summer, yet other treatments which missed the early summer, together with other cultivations, are not inferior to the good fallow. Indeed, the poor fallow which missed three cultivations gave a return equal to that of good fallow.

On the other hand, there is a difference of over 7bush. per acre between the good and poor fallows in Nottle's C. The autumn cultivations were the most important ones in 1934, whereas the plots which missed the one cultivation in autumn in 1935 appear to have benefited as a result, though the differences in yield are not significant.

The discrepancies in the results for the two years are no doubt due to the widely different nature of the seasons. In 1935 there were heavy rains in the early summer with plenty of moisture available at seeding, whereas in 1934, following good rains in March, there was very little rain until August.

The whole position is very complex and the actual benefits of fallowing are as far from solution as ever. The amount of readily available plant food, the moisture content at seeding related with the physical condition of the soil and the biological life of the soil are a few of the factors which enter into the problem.

Up to the end of the 1935 season, however, results have in no way illustrated that fallows might be neglected, though from the 1935 results themselves it appears that certain cultivations might be well omitted in certain years. The difficulty in this case is obvious, as the prediction of seasonal conditions still baffles our meteorologist and soothsayers alike. There is no evidence so far, therefore, to indicate that any of the cultivations can be safely omitted without running the risk of substantial decreases in yield.

Feeding Value of Chou Moellier

Chou Moellier.

The Echunga Agricultural Bureau asks "What is the analysis and feeding value of Chou Moellier"?

In reply Mr. W. J. Spafford (Director of Agriculture) says the leaves of Chou Moellier can be compared to cabbage and the stems to turnips, as the analyses and digestibility show:—

	Leaves		Stem or Roots.	
	Chou Moellier.	Cabbage.	Chou Moellier.	Turnip.
Composition—	%	%	%	%
Water	75.0	75.0	75.0	75.0
Ash	2.3	2.6	2.1	2.1
Crude protein	5.0	4.1	4.8	2.6
Fat	1.4	1.1	0.2	0.3
Nitrogen-free extracts	10.1	13.2	15.0	17.6
Fibre	6.2	4.0	2.9	2.4
Digestible nutrients—				
Crude protein	3.6	3.0	2.5	1.1
Fat	0.9	0.6	—	—
Nitrogen-free extracts	6.9	10.6	13.5	16.1
Fibre	3.4	2.8	1.2	0.9
Starch equivalent	13.4	16.3	15.3	14.1

The starch equivalent figures, which offer a strict comparison between the fattening or maintenance qualities of foodstuffs of the same kind, show that Chou Moellier leaves are not quite as valuable as the heart leaves of cabbages, while the marrow stems of Chou Moellier are a little better than turnip roots.

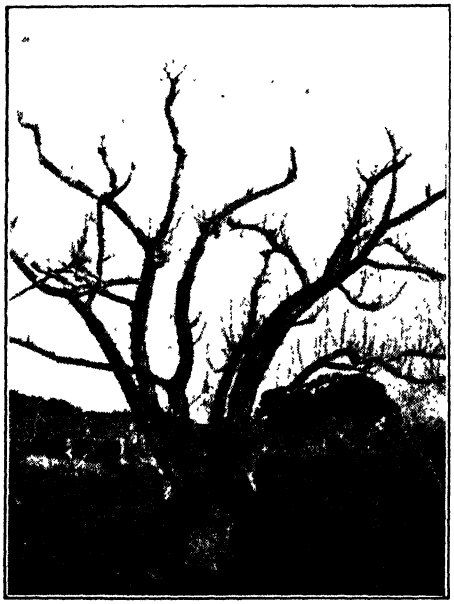
Reworking Fruit Trees

[PART II.—BY E. LEISHMAN, Horticultural Instructor.]

(*Continued from page 1473, July issue.*)

In the July *Journal* a full description was given of various methods of grafting hitherto commonly practised, and of reasons for the adoption of recently-developed modifications of the old method.

Severe heading back of the whole or part of a tree results in loss of valuable framework which takes a number of years to re-form, and the practice has been largely discontinued of recent years.



This Jargenelle Pear tree, 34 years old, was re-grafted to William's Bon Chretien last September, nearly 400 scions being inserted. The grafts have been summer pruned.

Apple trees have been successfully reworked by means of inserting Whip and Tongue and Oblique Cleft Grafts in small lateral branches and suitable spurs, or by removing all branches and spurs on the main arms and budding the resultant growth. Both of these methods have been shown to be satisfactory, and many trees have been so reworked in this State.

Main disadvantages of these methods are the time involved in carrying out operations, and where budding is employed, the fact that shoots from the pollarded limbs do not always come away from the most desirable parts of the limb.

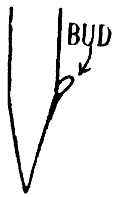
Limitation of the number of varieties of apples permitted export has necessitated in many orchards a quick change-over of varieties without the disability of waiting several years for return of normal crops. The newly-developed methods of reworking enables the main framework of the tree to be retained, and the complete replacement of the fruiting laterals with the desired variety. With this object in view a number of trees have been reworked by means of the Peg Graft or Bark Graft with varying results. The Peg or Plug Graft did not prove to be a signal success, but fair to satisfactory results were obtained when the use of the Bark Graft was adopted. Insufficient knowledge of the technique of the methods and varying climatic conditions have probably been responsible for some of the earlier failures of Peg Grafting and Bark Grafting.

The Peg or Plug Graft.

This method of grafting is variously named Peg, Plug, Porcupine, or Chisel Grafting—"Peg" on account of the short character of the scion; "Plug" because of the method of insertion; "Porcupine" on account of the appearance of the finished tree, and "Chisel" due to the use of a chisel for making incisions.

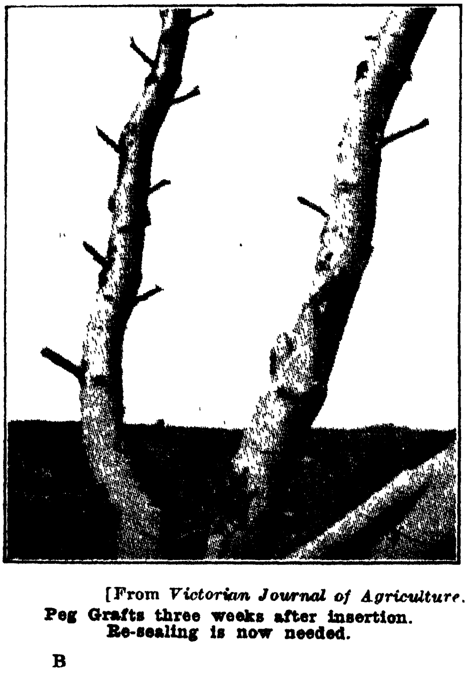
[From *Victorian Journal of Agriculture*.
Apple tree after pollarding.

The tree is prepared for reworking by complete removal of laterals and branches; these should be completely cut away just before reworking is to be done. In practically all parts of this State the treatment can be modified by leaving occasional lateral and spur growth to protect the limbs from sunscald injury. The scions are short, from 3in. to 4in. in length, and are cut to a wedge shape at the base, making a short bevel approximately $\frac{1}{2}$in. in length; a bud is retained just at the beginning of the wedge cut on one side.



A bud should be left at the beginning of the wedge cut on the scion

It is necessary to cut the scion straight at the top, as it is finally tapped into position with a mallet. In making incisions on the tree, either a $\frac{3}{8}$in. or $\frac{1}{4}$in. chisel on which the bevel is ground down to about double of its ordinary length, or a sharpened screwdriver is used. The chisel or screwdriver is driven with gentle force into the limb with the aid of a wooden mallet; the chisel is held practically at right angles to the growth of the limb, but with a slight downward tilt. These incisions are made along the limb, spacing as desired—usually 12in. apart—and deeply enough to take the wedge-shaped scions without exposing any of the cut wedge. It is desirable that all incisions should be made along the limbs before driving in any of the scions, as vibration would necessarily disturb any grafts previously inserted. The incisions are usually made on the upper side of the limbs. When limbs have been prepared the scions are gently tapped into the incisions with a wooden mallet. The wounds are sealed to exclude air by means of crude petroleum jelly.



[From *Victorian Journal of Agriculture*.
Peg Grafts three weeks after insertion. Re-sealing is now needed.

The "Pegs" or scions can be partly prepared the night before by cutting them to the desired length, but the wedges should not be made until just before insertion. This method of grafting has given good results in occasional instances in other States, but has proved practically a complete failure in orchards in the Hills district where it has been tried.

The Bark Graft.

It is essential, for grafting by this method, that the sap should be flowing freely so that the bark will lift without exercise of undue force.

Two methods have been adopted for opening the bark to receive scions:—(1) Inverted L (⅂) incision. (2) V-shaped incision. Trees are pollarded and limbs prepared in the manner described for Peg grafts.

(1) The Inverted L Method.

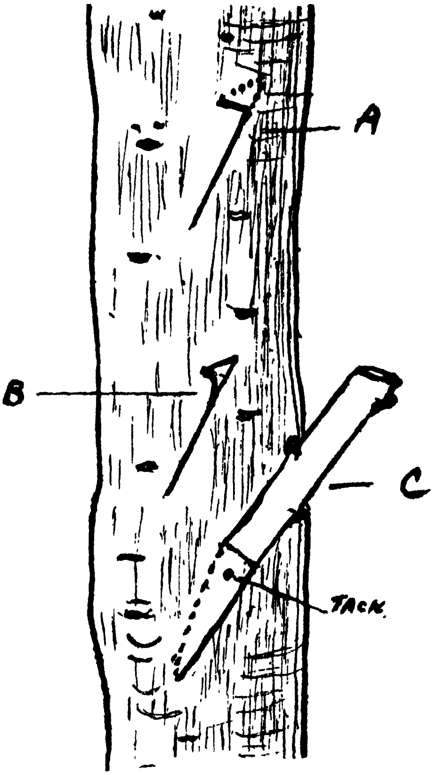
The scions are prepared in much the same way as in ordinary Rind or Bark Grafting, with a cut surface of about 1in. long on one side only.

The edge of the scion is trimmed so that it will fit snugly along the edge of the vertical incision in the limb, and it is advisable to leave a bud on the opposite side of the cut surface.

The scions should be cut from last season's growth, and should not be too stout—approximately the thickness of an ordinary lead pencil appears to be the most desirable size. Incisions should be made on sides of the limbs, and not on the top or underneath surfaces. Spacing of cuts must be left to the discretion of the operator, but spacing at 12in. intervals on alternate sides of the limbs is usually satisfactory.

All incisions should be made as small as possible, taking care that the vertical incision of the inverted L is on the lower side of the limb; this arrangement will prevent lodging of moisture in the wound. At the top of the horizontal incision a small triangular piece of bark is removed so that the scion will fit in snugly. The scion is placed in position by slightly lifting the edge of the cut bark, then with gentle pressure pushing it under the bark until no white cut wood surface is showing. A small tack or bootmaker's tingle is usually driven through the bark into the scion to keep it in position. Size of the tingles used depends on the thickness of the bark, and it is desirable to have two sizes on hand, viz., ⅝in. and ⅜in.

After the scion has been inserted the wound is sealed to exclude air with crude petroleum jelly, using the minimum quantity necessary to cover the wound. Mistakes have been made in sealing by using a refined petroleum jelly and in too liberal a quantity. During summer excess jelly will run down the bark and sometimes causes a certain amount of injury and death of tissue. It is advisable to inspect the grafts occasionally and to reseal with petroleum jelly as required. Strap Grafts should be used to finish off the terminals of limbs when the wound is over 1¼in. in diameter. Such grafts are more secure than the ordinary Rind or Bark Graft, and exposed wood is rapidly covered by callous. Strap grafting has already been described in the first part of this series or articles.



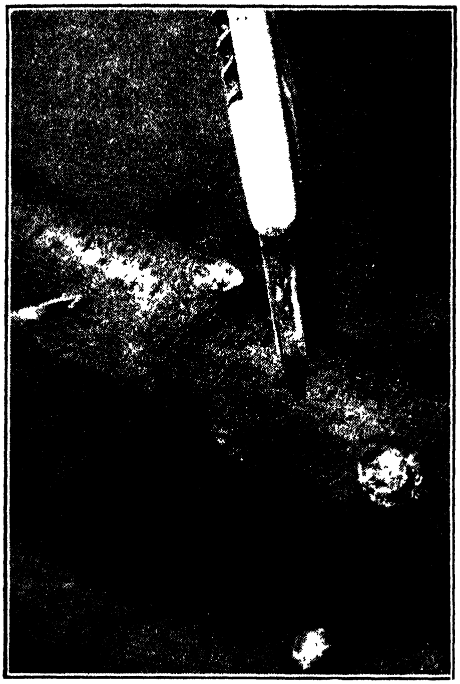
A—Inverted L cut in bark
B—Bark turned back.
C—Scion is in position and a tack inserted.

These Bark Grafts in their second year show the development of the fruit buds.

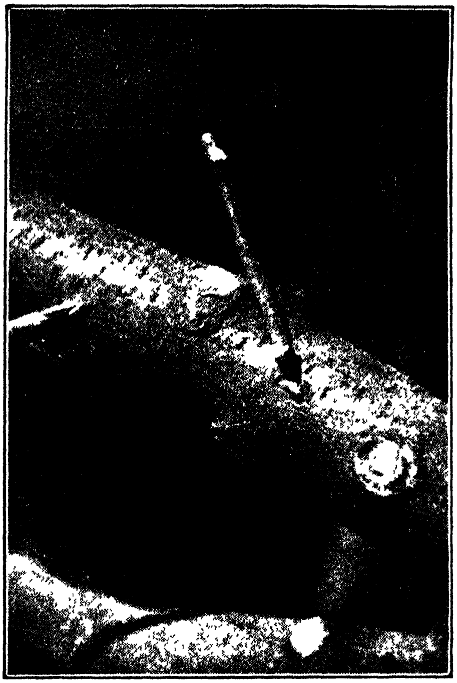
(2) V-shaped Method.

It is claimed in other States that if the incisions are V-shaped (instead of L-shaped) it is unnecessary to fix the scions in position by means of tingles or ties, as the tension of the bark holds the scions sufficiently strongly to keep them in position. The incisions preferably are made with a knife, the end of which is ground chisel shape. Two converging incisions are first made in the bark, and the section is gently lifted by means of the knife blade. (See illustrations on next page.)

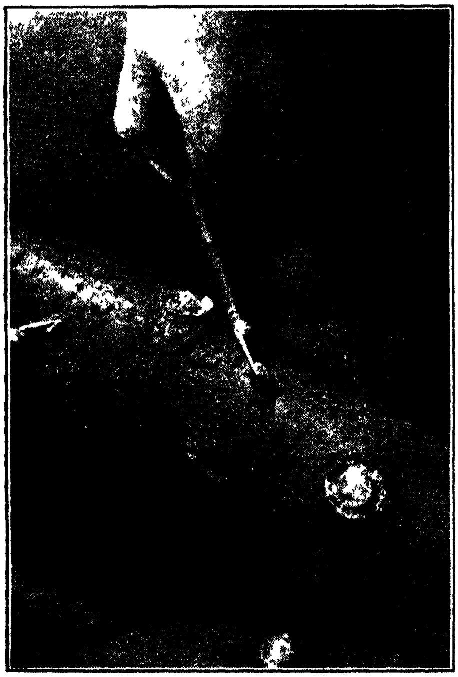
The scions are prepared in the same manner as for ordinary Rind or Bark Grafts, but are trimmed to a wedge-shaped end which enables insertion under the bark. When scions are gently forced into the prepared incision the V-shaped portion of the



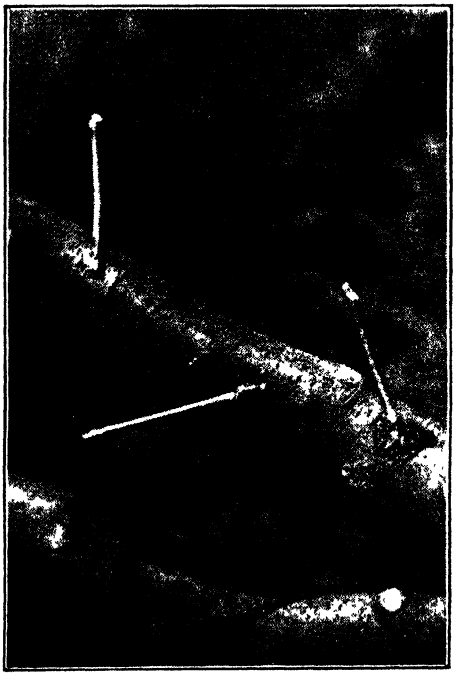
The method of lifting the bark.



The graft has been inserted and a V-shaped piece of bark removed



Inserting the Scion.



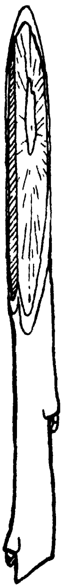
The grafts are in position and have been waterproofed.

[From *Victorian Journal of Agriculture*.

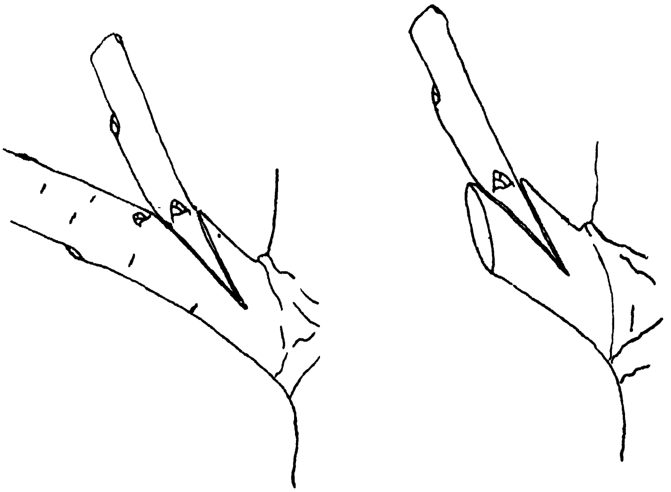
bark protrudes somewhat, and this portion should be trimmed with a sharp knife before sealing with crude petroleum jelly.

Combination of Methods.

From experience gained since the initiation of these "modern" methods of grafting, a modification is suggested for use on apple trees. Instead of using the Bark Graft entirely it is recommended that suitable side branches and strong spurs be worked with the Oblique Cleft or Whip and Tongue Grafts, and that Bark Grafts be placed in the bare spaces between selected lateral branches and spurs; a Strap Graft should be used at the cut extremity of the limb.



Scion prepared for the Bark Graft.



The Oblique Cleft Graft.
[From East Malling Research Station Report.

Method of Working Side Branches and Spurs.

This method is simple in operation, and has been successfully carried out for a number of years. It can be performed rapidly, and does not entail the use of ties if the operation is successful. The scion is prepared in the form of a wedge with a sloping cut about ½in. long on one side, and a similar cut twice as long on the other side. The lateral branch to be grafted is cut towards the base in a sloping manner. (See illustrations below.) By means of bending the branch the cut is opened and the prepared scion inserted; when the tension on the branch is released the cut closes, and firmly holds the graft in a secure position. The branch may then be severed immediately above the insertion of the scion, and the cut surface is sealed as in other methods of grafting.

On smaller shoots Whip and Tongue Grafts are preferable to the Oblique Cleft Graft described in the foregoing.

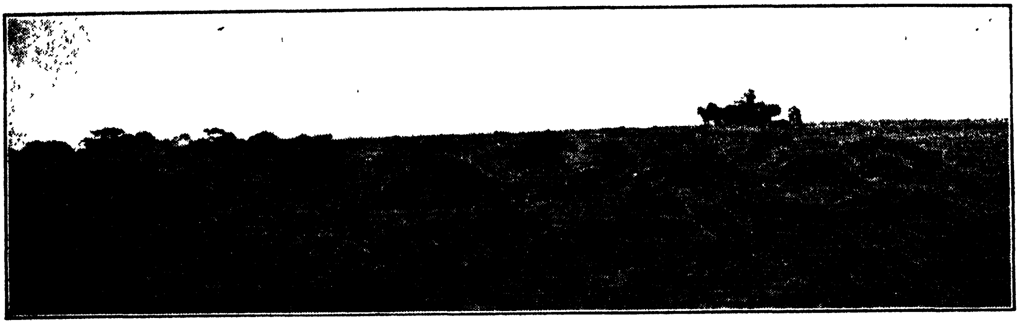
Reworking of apple trees by means of a combination of these three types of grafts has proved very successful.

Selection of Wood and Storage of Scions.

Wood for reworking should be selected from well-ripened annual growths and cut when the tree is dormant. Gross-grown cuttings should not be taken, the best types ranging about the size of an ordinary lead pencil. Cuttings are taken from healthy trees of fine type and proved yielding capacity, and are "heeled in," preferably under an evergreen tree, and kept moist. Under these conditions they remain dormant sufficiently long to cover the grafting period. Cold storage has also been used with success for holding the scions.

Sealing Materials.

The principal mastic used in sealing of Bark Grafts is a crude brown petroleum jelly, and it appears that this material assists quick callousing of the wounds. The lighter refined petroleum jellies are useless as they are of lower melting point, and run badly in hot weather. A 50-50 combination of Paraffin Wax and crude petroleum jelly is a useful sealing preparation, being plastic without being sticky, and less likely to run. Several mastics of proprietary manufacture are being subjected to test this season.



This property at Mount Barker was at one time considered good cereal country, and has now been changed to pastures.

Agricultural Practices in the Hills—A Glimpse into the Future

[ROWLAND HILL, District Agricultural Instructor.]

The pioneers of South Australia arrived in a new country, some with previous agricultural experience, but all with much to learn in a new environment. Undoubtedly, many mistakes were made, but their wisdom in recognising the potential value of lands in assured rainfall districts was a gift of foresight unfortunately not inherited by later generations. As in all new countries, the early settlers based the methods of farming upon experience gained in their home land, but the many differences due to climate, soil types and access to markets for their produce forced adaptation to the altered conditions. However, experience and science have taught us much, and we can look to the future with confidence in our ability to make progress in rural districts favoured with a good annual rainfall.

The Agricultural History of County Hindmarsh.

It is realised that the soil in county Hindmarsh is typical of much of the high rainfall areas given consideration in the early days of settlement. For the benefit of those not familiar with the county boundaries, county Hindmarsh comprises all that land south of a line extending from the coast at Sellick's Hill to Mount Compass, Meadows, Echunga, Mount Barker Junction and Mount Barker, eventually meeting the coast again in the vicinity of Point Sturt.

The early settlers directed their attention to wheat as their main cultivated crop and carried what livestock they could on the natural pastures of the most fertile lands available. As development progressed, cultivated crops for livestock were grown. The sowing of introduced grasses and clovers was not generally practised, although there is evidence of their introduction to a limited degree. The presence of numerous old flax mills indicates that the early settler believed that the country was adaptable to a diversified type of farming.

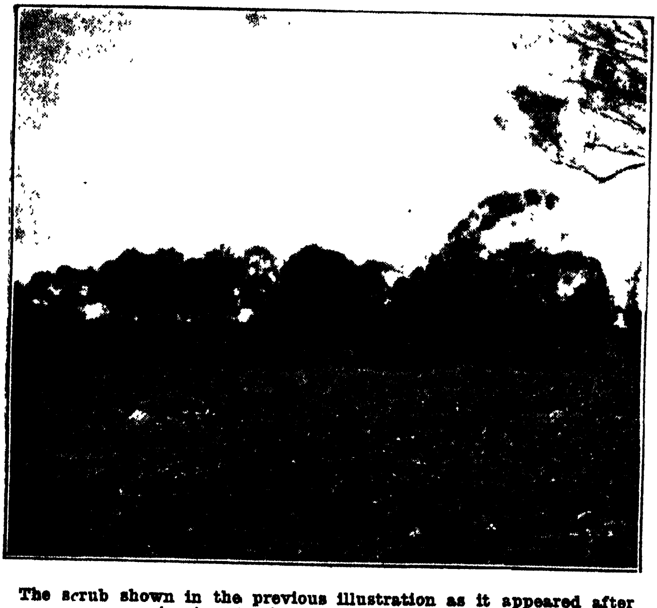
As in all agricultural countries, the time arrived when some type of leguminous plant was needed to maintain the fertility of soils under constant cultivation and peas were introduced into the rotation by the more progressive farmers. By this time, much of the land used for wheat growing during the early years of settlement was failing to produce economic returns, and was being abandoned for that purpose and left to grow natural pastures or to revert to its original state. The well defined old furrow marks present in land carrying trees, possibly 50 years of age, are a preserved memory of numerous failures due to lack of soil fertility for the particular purpose. However, the introduction of phosphatic fertilisers, better cultural methods and the accumulated knowledge of crop rotation revived the industry, only to find that cereal growing was gradually transferred from the high to the lower rainfall areas of the State.

Subterranean Clover, found on the late Mr. Michael Daley's property at Blakiston in 1889 by the late Mr. A. W. Howard, attracted the latter's attention, but it was not until some years later that he realised the possibilities of that legume. About 1900 he commenced advocating its use as a pasture plant and I have since often admired him for his enthusiasm and tenacity in advocating its worth.

It was not, however, until the use of superphosphate was advocated for "top dressing" that Subterranean Clover was presented in its true colours and became the medium of revolutionising the agricultural practices in our high rainfall areas. Not only has it increased the production of those areas that remained under cultivation and grazing, but the abandoned lands and large tracts of previously despised scrub land have been brought into profitable production.

Thus, this vigorous legume, assisted by superphosphate, will be a dominating factor in the future agricultural work in county Hindmarsh and similar country.

Typical virgin scrub The next illustration shows its appearance after clearing.



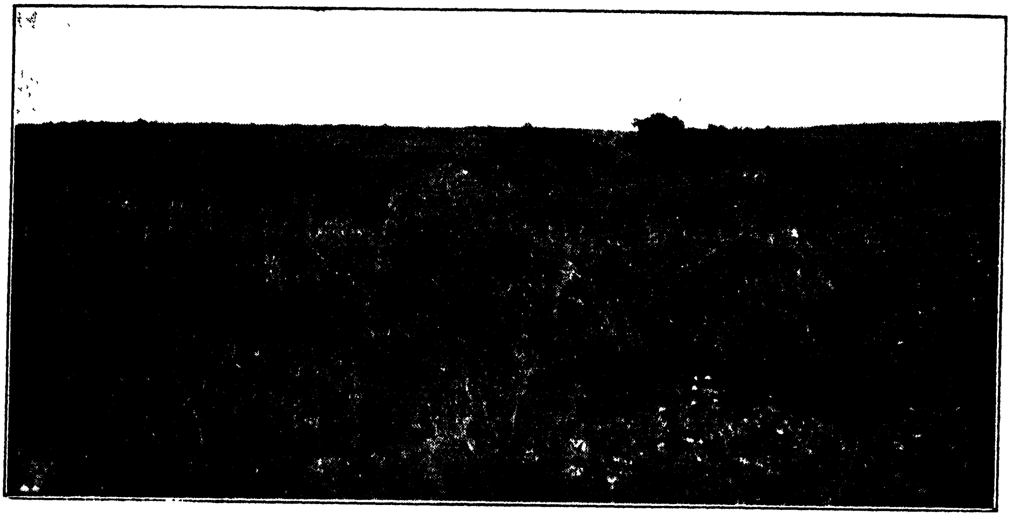
The scrub shown in the previous illustration as it appeared after treatment with the rotary hoe only.

As a pioneering plant, a soil renovator and a pasture legume it has no peer under these conditions, and it is fortunate that we are in the happy position of having solved the ground work for developing these areas for grassland farming and better cultivated crops. Unfortunately, it must be admitted that the establishing and management of pastures in this State is no more than in its infancy. However, results obtained by the more progressive farmers are such that one can face the future with confidence, knowing that soil fertility can be economically improved, thus allowing us to practise a diversified type of farming which is an essential attribute of rural settlement.

There are few farms, if any, in county Hindmarsh which have been developed to their full capacity, and even with the present knowledge of handling this country, the large area of scrub land suitable for development and untouched is a condition which should be allowed to exist no longer. No holding can be fully developed without concentration on improved pastures and good pasture management, including close subdivision and the conservation of fodders, all of which are more likely to be attained on small holdings. This is a lesson constantly placed before us by men who have recently had the opportunity of visiting the country efficiently managed in New Zealand.

Handling a Virgin Block.

Experimental work conducted in many districts has helped considerably as a guide in ascertaining the most economical methods of handling virgin country, and although it is difficult to generalise, one can now recommend sound cultural methods as being more important than was hitherto thought. On no account should deep ploughing be practised on virgin country, and on the lighter types of soils a cultivator will give better results than a plough, provided there is not too much rubbish to handle. The use of a culti-packer on well-cleared virgin land at Delamere improved the seedbed and an excellent germination was obtained. It is quite possible that much more will be heard of this implement for that particular work, provided the initial clearing work is well carried out.



Typical swamp country at Mount Compass before clearing. The following pictures show conversion to pastures

The country illustrated in the previous picture has been sown to Red clover 2 years after clearing

Where shoots and bush growth prove to be difficult to destroy, the practice of obtaining a burn in the second year with Wimmera Rye Grass has given satisfactory

Poor sandy land at Inman Valley Second year of clover in bracken. Sown with oats and 2lbs subterranean clover seed.

results on Kangaroo Island and is worthy of consideration on the mainland. The use of ½cwt. of Sulphate of Ammonia plus Superphosphate has ensured sufficient growth of Wimmera Rye Grass for good burn. Because of the additional cost it can only be recommended on the poorest types of soils and in cases where it is necessary to give a second burn. When this method of clearing is adopted, the inclusion of Subterranean Clover in the first year appears to be a wasteful procedure, and it should not be sown until the land has received a light cultivation following the second burn. Wimmera Rye Grass sown at the rate of 6lbs. per acre will give sufficient growth for an excellent running burn and leave ample seed to establish a good pasture in mixture with the Subterranean Clover the following year. A light seeding of oats as a cover crop is of considerable value, particularly on sandy soils and 40lbs. per acre are sufficient. There is still much to learn concerning the best varieties of oats to use, although it seems certain that a quick-growing, erect type will prove the most valuable.

The diversity of opinion regarding the grade of clover seed to sow on virgin country continues to be a topic of interest among settlers, but several years of observation have convinced me that the lower grade samples containing a quantity of dust have shown a pronounced advantage over that more thoroughly cleaned. The explanation appears to be in the inoculation of the soil by bacteria carried in the dust from old established clover fields. That Lucerne Flea is more likely to be carried in the lower grade samples is an objection raised, but it must be admitted that this undesirable pest quickly appears in well established

Subterranean clover on poor sand at Inman Valley. Sown with 2lbs clover seed and a cover crop of oats Two years old.

clover fields no matter what precautions may be taken. The McDougall strain of Wimmera Rye Grass has been outstanding, and at the present time no better annual pasture grass can be recommended.

The general practice, however, in this district is to sow Subterranean Clover the first year, which is the correct procedure when a second burn is not deemed necessary, but the early carrying capacity of pastures can be appreciably improved by the addition of 2lbs. of Yorkshire Fog Grass seed per acre. Yorkshire Fog Grass has been too readily condemned in the past, but in recent years has been recognised as the most persistent of all grasses on raw soils and a very valuable addition to freshly established pastures on new country.

The quantity of Superphosphate used per acre has fortunately increased and failure to apply liberal dressings in the vicinity of 2cwts. per acre is false economy.

Having established temporary pastures as a soil improver, it will be possible to look to a very much improved carrying capacity until such time as the inferior annual grasses and weeds show prominence, indicating that the nitrogen level and general soil fertility have been raised sufficiently to introduce the better types of pasture grasses or to make full use of the land for any necessary cultivated crops.

Having reached this stage of pasture development, farmers will quickly recognise the value of diversified farming, turn their attention to cattle, sheep, pigs, pastures and cultivated crops, being satisfied to obtain maximum returns from small holdings. To hold markets overseas there must be continuity of supplies, and this can only be maintained by developing districts favoured with an assured rainfall.

Greenfeed for Horses and Cattle.

Mr. W. J Spafford (Director of Agriculture) has advised a member of the Clanfield Branch of the Agricultural Bureau, who asks, "Can a comparison be made of the following greenfeeds for horses and cattle—wheat, oats, barley, and rye?" that the analyses and digestibility of the green growth of wheat, oats, barley, and rye are strictly comparable, because of the similarity of the plants.

Green Growth.

	Wheat.	Oats.	Barley.	Rye.
Composition—	%	%	%	%
Water	75.0	75.0	75.0	75.0
Ash	3.2	1.9	1.6	1.5
Crude protein	3.7	2.1	1.7	3.0
Fat	1 1	0.6	0.4	1.3
Nitrogen-free extracts	10.6	11.2	13.4	13 0
Fibre	6.4	9.2	7.9	6.2
Digestible nutrients—				
Crude protein	2.6	1.5	1.2	2.1
Fat	0.8	0.4	0.2	0.9
Nitrogen-free extracts	7.0	7.0	9.6	8.6
Fibre	4.0	5.3	5.1	3 8
Starch equivalent	12.0	10.6	13.2	12.9

The starch equivalent figures, which are a fairly accurate comparison for fattening or maintaining farm livestock, show that if each of the four cereals made an equal amount of growth to a given time, barley with a starch equivalent percentage of 13.2 would be the most valuable, followed by rye with 12.9 per cent., wheat with 12.0 per cent., and oats with 10.6 per cent.

In no place in the State, however, can equal growth from all cereals be expected, and so the suitability of the cereal to the locality will be the controlling factor always. As a matter of fact, over a run of years in practically all of our cereal-growing districts a mixture of oats, barley, and rye would give much better grazing results than would any single cereal, and greater even than if the three cereals were sown on the same farm but in separate plots.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Barley for Horses.

Clanfield asks "Which is the best way to feed barley to horses; crushed, ground, boiled or soaked"?

Reply—Barley is a good feed for horses and the best way to use it is to replace part of the oat allowance (or to use in conjunction with oaten hay chaff) with it. Up to 10lbs. per day can be fed to a horse, but it must be introduced into the feed carefully, from 1lb. to 2lbs. a day to start with. It is advisable to crush it.

Death of Young Pigs.

Secretary, Cambrai Agricultural Bureau, asks "Cause of sow going off feed after farrowing, losing her milk and the death of the piglets"?

Reply—This is due to lack of green food in the diet causing a deficiency of vitamin A. Any of the following foods are satisfactory in supplying the necessary vitamin:—

(1) Green lucerne.
(2) Clover.
(3) Cod liver oil (½oz.).
(4) Whole milk.
(5) Raw liver (sheep, cattle or pigs).
(6) Green peas.
(7) Linseed.
(8) Green cabbage.

The following are poor in the necessary vitamin:—

(1) Barley.
(2) Oats.
(3) Wheat.
(4) Skim milk.

The addition of a mineral mixture at the rate of ½oz. a day in the food or as a lick would be beneficial:—Charcoal, 20 parts; hardwood ashes, 20 parts: bonemeal, 10 parts; salts, 5 parts.

Toxaemia of Pregnancy in Ewes.

Secretary, Wallala Agricultural Bureau, reports ewes single off from the flock, walk around in circles and finally paralysis of hind legs.

Reply—There is a disease known as "Toxaemia of Pregnancy" which occurs in ewes during the last six weeks of pregnancy and which usually occurs only among good conditioned sheep, and always before the lamb is delivered.

Cases similar to "Milk Fever" in cattle do occur in ewes, and in the cases you mention as occurring after the lamb was born, this may be the trouble. In these latter cases try the milk fever treatment, *i.e.*, inflate the udder with air, using an ordinary bicycle pump with valve from bicycle tube, but taking care to sterilise the latter by boiling in water for five minutes and washing the teats and udder of ewe before inserting the tube. Also be sure to mark the ewe so that she can be identified, or keep in a yard where she can be observed. Without further information a diagnosis cannot be made as to what the disease is which is causing mortality.

Wind Erosion of Soils in the Agricultural Areas.

Attention is drawn to a misplacement of pages in printing the August issue. In the article on Wind Erosion of Soils in the Agricultural Areas, by Mr. R. L. Griffiths, the text on pages 36, 37, and 38 should have followed page 30.

Tests of Quality Adapted to Hand-Ground Meals

[A. R. Hickinbotham, B.Sc., Dip.Ed., A.A.C.I., Chemist, Agricultural College, Roseworthy.]

Synopsis: The Wholemeal Fermentation Test Number of stronger wheats increases with increasing rate of gas formation. This, combined with observations on the mechanism of the break of doughballs, leads to a clearer appreciation of the value and limitations of the test.

Introduction.

The importance of the problem of Baking Quality in wheat has been fully discussed in recent issues of this Journal (1, 2, 3, 4,). It is well understood that this is a highly complex character and that no test of any single factor can be expected to give adequate indication of the suitability of a sample for baking purposes. Nevertheless, it is of the greatest importance that the breeder should be able to obtain some estimate of quality at a comparatively early stage of development of new wheats, that is, when only very small amounts of grain are available. With these limitations, absolutely reliable tests of quality cannot be expected; it is sufficient if they show, with a reasonable degree of probability, that certain lines obtained from any cross are better than others.

It is, of course, a great advantage if the tests can be applied to wholemeal, or to material obtainable from samples of grain by simple methods of grinding and sieving. The Wholemeal Fermentation Test (Pelshenke Test) fulfils the necessary conditions and has been widely adopted by plant breeders. It attempts to give an estimate of baking quality as a whole, but it must be supplemented by other tests. Of the single factors which contribute to quality, and which are susceptible to measurement, the most significant is gluten which is constituted by the nitrogenous portions of the grain. The next most important factor, especially in Australian wheats, is maltose production in the dough, for our wheats tend to be characteristically deficient in this respect. Gluten confers on the flour the capacity to handle well and produce a large loaf, and maltose production must be adequate if the possibilities latent in the gluten are to be realised; a good flour must show a nice balance between these two factors.

maltose production of diastatic activity of

This paper presents an account of work done with the object of better defining the value and application of the Wholemeal Fermentation Test, and also in adapting tests for maltose production, nitrogen and gluten contents to hand-ground grain. Finally, the results obtained in applying these tests to 345 samples of Ford wheat grown throughout the State will be recorded.

The Wholemeal Fermentation Test.

The Wholemeal Fermentation Test, though not completely reliable (2, 3), is of the greatest value to breeders because of its rapidity, economy in material, and ease of operation. The present status of the test may be gauged from the work of Bayfield (5) who, after a collaborative study and a review of opinions of investigators throughout the world, concluded: "the test will prove helpful to the wheat breeder as a low cost aid in segregating the undesirable extremes in breeding material at an early stage . . . For differentiating between new wheats in the median group, a more refined test than the time-test will be needed . . . mills and purchasers of wheat will find it advisable to observe considerable caution in employing the test." In other words, the test is not sufficiently reliable for the evaluation of single samples, but when the average results for a number of different groups of samples are considered, it will place the groups approximately in their correct order.

Reference has been made previously (2) to one further problem arising from the application of this test which has now been further studied, viz, whether the maltose production or diastatic activity of the meal had any effect on the test number. The results, as shown below, indicate one important defect of the method.

It seemed reasonable to suppose that wheats possessing a low diastatic activity would be favoured by this test since they would be expected to produce less carbon dioxide during the test, resulting in less stress on the gluten and, consequently, a higher test number. It has been suggested that the comparatively high results given by Ford, for example, which is particularly low in diastatic activity, might be due to this. The results stated below, however, show that the reverse is true; that is, that a high diastatic activity results in an increase in the test number.

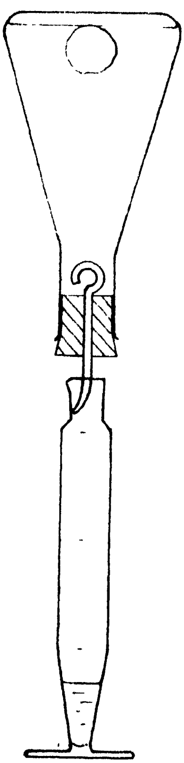


Figure 1.
Apparatus used for measuring rate and total gas production in doughballs.

The effects of added sugars, malt flour and yeast food on the test number were examined in several experiments of which the following is typical. A sample of Ford, extremely low in diastatic activity, was selected for test with various additions as shown in Table I. The malt flour was substituted for an equal weight of meal, but the sugars were added. The maltose production in one hour at 30°C. for the original sample, and the sample with certain of the additions, was also determined by the method of Blish and Sandstedt (6).

TABLE I.—*The Effects of Malt Flour, Sugars, and Yeast Food on the Wholemeal Fermentation Test Number of Ford (Temp. 29°C.).*

Sample Tested.	Maltose Production in 1 hour.	Test Number (Replicates)		
Wholemeal	100	62	64	
Wholemeal with ½% malt flour	162	63	64	
Wholemeal with 1% malt flour . . .	189	65	68	
Wholemeal with 1½% malt flour .	208	65	68	
Wholemeal with 2½% malt flour . . .	248	66	70	
Wholemeal with 1% malt flour, plus 1% mineral salts	184	65	69	
Wholemeal with 1% mineral salts only	149	64	66	
Wholemeal, plus 1% maltose (malt sugar)	—	68	70	75
Wholemeal, plus 1% sucrose (cane sugar)	—	67	69	75
Wholemeal, plus 1% glucose (grape sugar)	—	69	74	78
Wholemeal, plus 2% maltose . .	—	88	104	110
Wholemeal, plus 2% sucrose . .	—	81	109	125
Wholemeal, plus 2% glucose	—	96	96	100

NOTE.—The malt flour and mineral salts were commercial samples kindly supplied by Nycander and Co. Pty., Ltd.

Malt flour greatly increased the maltose production, and also increased the test number but to a much smaller extent. The sugars all caused appreciable increases in the test number, the increase resulting from 2 per cent. of any sugar being proportionally much greater than that from 1 per cent.

When other varieties are tested with added sugars in the same way the results show the same general tendency, but to a different extent according to the strength (as indicated by this test) of the variety. With weak varieties the increase is negligible, but with varieties of medium strength the increase is more marked, as shown in the following table (averages from one experiment in duplicate).

TABLE II.—*Effect on the Wholemeal Test Number of Different Varieties resulting from the addition of Sugars (Temp. 29°C.).*

Variety.	Maltose Production.	Test No.	Test No. with 1 per cent. added. Maltose.	Test No. with 1 per cent. added. Sucrose.	Test No. with 1 per cent. added. Glucose.	Test No. with 2 per cent. added. Maltose.	Test No. with 2 per cent. added. Sucrose.	Test No. with 2 per cent. added. Glucose.
Sword . .	130	47	48	50	50	54	57	53
Gluyas . .	132	36	36	35	37	37	37	38
Ranee . .	174	38	41	38	40	43	42	43
Ford . . .	100	64	71	70	73	101	105	97
Baringa	187	37	38	38	38	38	38	39
King's White	109	40	41	41	42	42	41	43
Florence	175	112	130	127	129	134	146	134

The increase in the test number that occurs when sugars or malt flour are added is accompanied by, and is apparently the direct result of, increased activity of the yeast and a greater rate of gas production. This is illustrated by the graphs (Figs. 2, 3 and 4) which show the results obtained by measuring the gas production as follows:—The doughballs, made in the usual way except that 10gm. of meal was used, were placed in an inverted flask (Fig. 1) so arranged that the expansion was measured by means of the water forced from the flask as the ball expanded; the amount of water in the measuring jar was read off at two-minute intervals until the balls broke. This method measures only the gas retained within the balls. Examination of the water in which they have been floating indicates that very little gas escapes compared with that retained, especially in the early stages of the test, but towards the end of the "life" of the ball there is a steady decline in the measured rate of expansion with stronger varieties and a sharp decline with weaker ones and, in the latter, the flask frequently sucks back.

The curves given by Ford without addition, and with 1, 3, and 5 per cent. of malt flour substituted for the same amount of meal, are shown in Fig. 2. These curves are composites from 5 replicates in each case, and they show that the additions progressively increased the test number, and also increased the rate of, and especially the total, gas production. In Fig. 3 similar curves are shown for Ford meal without, and with 1 and 2 per cent. added cane sugar, and for Sword without, and with 2 per cent. added; the results are of the same kind as those obtained with malt flour. In Fig. 4 similar curves for a number of varieties without any additions are presented.

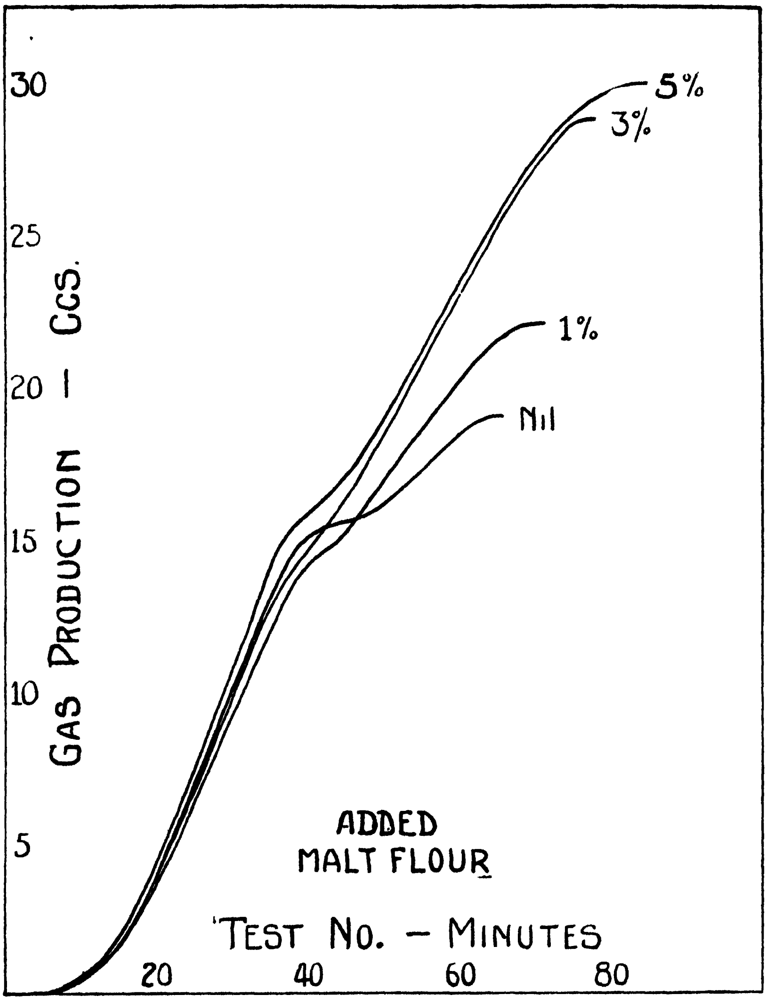


Figure 2.

Showing the effects of increments of malt flour on the rate of gas production and the test number of Ford.

A number of deductions may be drawn from these curves. First, the rate of gas production is nearly the same for all varieties during the first 30 to 40 minutes, and it is also nearly independent of any additions made to the meal. Variability in factors affecting the rate of gas production is apparently of little importance during this stage.

Between 30 and 40 minutes there is a sharp decline in gas production (as measured by this method), but it is less marked in the presence of added sugar and when maltose production is at a high level. The cause of this is not at present clear; it may represent the point at which the yeast changes over from pre-existing sugars to those produced by enzymes (suggested by the changed rate after this point and the effect of the additions) but it is probably due, in part at least, to the rate of gas formation exceeding the rate of gluten development, resulting in a loss of gas from the ball until the gluten takes up again sufficiently to hold it. In either case it appears that water must penetrate the ball at this stage and considerably weaken its structure. As a possible result, many balls may break down somewhat prematurely shortly after this happens.

After this decline, the rate of expansion picks up again and proceeds at a rate that is more or less proportional to the maltose production of the meal. The new rate tends to be constant for some time.

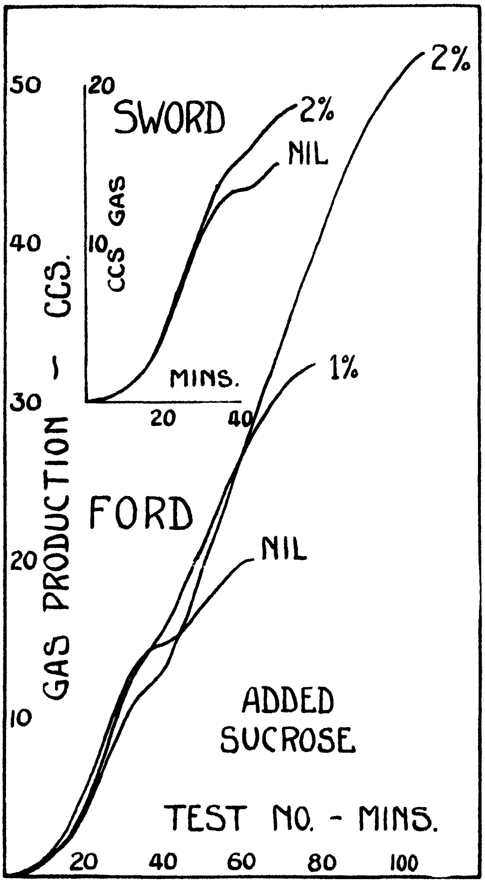


Figure 3.
Showing the effects of increments of sugar on the rate of gas production and test number of Ford and Sword.

Towards the end of the life of the ball the rate of expansion declines again. With stronger varieties (measured by this test) the decline is gradual, the rate dropping until, for the last few minutes, it is about one-fourth or less of the earlier rate. With weak varieties the rate of expansion falls to zero and remains at zero often for some minutes before the ball finally breaks up, and during this time the flask frequently sucks back. These declines evidently represent an increased rate of solution of gas, and not a decrease in the rate of gas formation.

When more sugar is available to the yeast the stronger varieties show a considerably increased test number, but this is accompanied by a still greater total expansion of the ball (Figs. 2 and 3).

The mechanism of the break up of the ball is clarified to some extent by these observations. Varieties that give a test number of less than 40 to 50 minutes are disrupted by the mechanical stress resulting from gas formation, and this may happen because the gluten is really weak, or because the gluten is slow in developing. In either case the gas formed will be in comparatively large bubbles which exert a considerable disruptive effect, but little buoyancy effect on the lower layers of the dough. When expansion begins to disrupt the ball, water seeps in dissolving gas (indicated by decreased rate of expansion and sucking back), temporarily relieving the pressure, but also dissolving any gas which is conferring buoyancy through being dispersed in finer bubbles throughout the dough. The lower layer is then unsupported, either by coherence of the gluten or entrained gas bubbles, and sinks.

On the other hand the stronger varieties, and these are the ones that tend to flatten out during test, have better gluten whose development is sufficiently rapid to hold most of the gas formed in minute bubbles dispersed throughout the dough. Under these conditions the gas confers buoyancy on the dough which results in the flattening out of the ball, so that the disruptive effect and particularly the breaking effect of the weight of the lower layers, is practically eliminated. As the gluten becomes more distended, however, water diffuses into the dough and gas dissolves in the water. The dough will therefore float so long as the buoyancy effect persists, that is, so long as the gas is formed at a greater rate than it is dissolved in the water (gas is, of course, still increasing in upper layers when it is decreasing in lower layers). The test number obtained now depends to a large extent on the original sugar content and maltose production in the dough.

Conclusion.

The Wholemeal Fermentation Test, therefore, classifies wheats into three distinct groups:

Group I.: Weak wheats whose test number is less than 60 minutes, or those which retain the ball shape during test. With these, particularly those whose test number is less than 40 minutes, the results obtained agree well with their true strength unless the sample happens to belong to group III. Unfortunately these are so weak that they are of little interest.

Group II.: Medium and stronger wheats whose test number exceeds 60 minutes, or those which flatten out during test. In this group the result depends to a considerable extent on whether the rate of maltose production is nicely balanced against the gluten or not. If the maltose production varies widely, differences of at least 50 minutes have no significance, even in varieties of medium strength. In the strongest wheats the non-significant differences may be much greater.

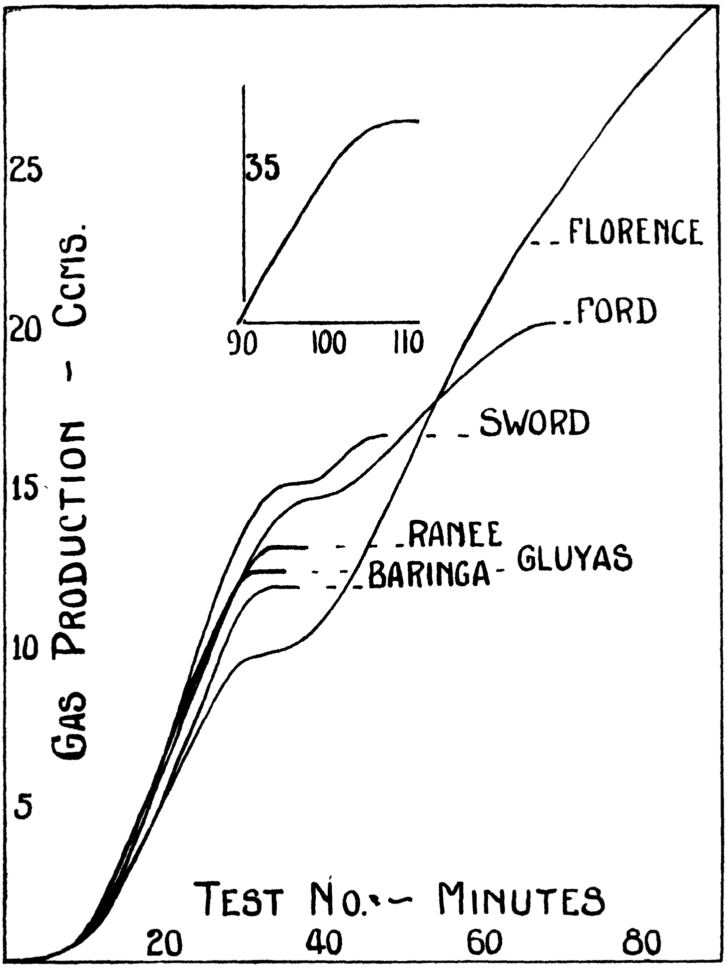


Figure 4.

Showing the effects of added sugar on the rate of gas production and test number of several varieties.

Group III.: Occasional samples of stronger wheats which fall in group I. because of slow gluten development. These appear to give somewhat better results when more finely ground, and when the moisture content at grinding is high (7). Some samples of Quality and Florence appear to fall into this group.

The test, therefore, is very useful to the plant breeder for the purpose of excluding very weak and weak lines, though the rejects will include samples belonging to Group III. Fortunately, this covers the primary objective in selection for Australian plant breeders, and as a result, the test retains most of its significance. Within the medium strength group, testing between 60 and 120 to 150 minutes, however, it is of very limited value owing to the influence of variable maltose production, and in this respect, the usefulness of the test appears to be increased by considering the result in conjunction with a maltose determination.

For trade purposes, if a single sample is under consideration, the test is not reliable except for excluding the weakest. If, however, a large number of small samples are being purchased with the object of mixing the lot together (as is done by many country millers), the average result will be of definite value, even though maltose production and strength are being confused to some extent. In this case, there is safety in numbers.

Finally, the results and conclusions stated above suggest the possibility of improving the test for medium wheats, chiefly by some method of standardisation of the gas production. Owing to its suitability from the manipulative point of view, and its adaptability to early germinations, the test meets a definite need, and it is therefore a matter of importance that some effort should be made to explore the possibilities of improving it for discrimination within the medium strength group.

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(*To be continued.*)

Feeding Tests at Parafield Poultry Station

[By C. F. Anderson, Government Poultry Expert.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April, 1935, to 31st August, 1936.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal, 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

5. *Mash*, during autumn and winter.—Crushed barley, crushed wheat, chaffed greenfeed and meatmeal. During spring and summer the mash is varied, bran being substituted for the crushed barley.

Grain.—2ozs. wheat per day.

	No. Eggs Laid 1st April, 1935, to 31st July, 1936.	No. Eggs Laid Month of August, 1936.	Total Eggs Laid 1st April, 1935, to 31st August, 1936.
No. 1 Test	8,630	627	9,257
No. 2 Test	8,783	508	9,291
No. 3 Test	9,588	621	10,209
No. 4 Test	7,684	524	8,208
No. 5 Test	7,873	649	8,522

Type of Lamb for Export

The Agent-General (Mr. C. F. G. McCann) was recently asked the following question:—"What does the English Lamb Market want"? In his reply, Mr. McCann stated that the English market, under present restrictions, could absorb everything we produced if the output was properly distributed and advertised. The accompanying remarks dealing with type are extracted from the reply.

It was not so much a question as to whether we could produce as high a percentage of first grade lambs as some of our greatest competitors, because there was a market for all grades and qualities if they were put before the United Kingdom consuming public in true relationship as to quality, and distributed on a commonsense basis, with due regard to the absorbing capacity of this market.

Down or other English bred crosses, as produced in Australia, if marketed and advertised as such, were equal in quality to any lambs similary bred anywhere in the meat producing world. Practical experience, however, had always demonstrated that even in these crosses, condition must never be confused with quality. The present living conditions of to-day's meat consumers called for small joints, and light weights would always command a price premium, but quality and conformation would sell even heavier grades to better advantage than similarly weighted lambs lacking breed and shape. Consequently, the action of the Meat Board in instituting shipments of crossbred lambs in separate parcels was bound to have a beneficial effect upon the net financial return for lambs of this description. There was a good market for all weighted secondary grades of our lamb production, irrespective of breeding, provided they were marketed in the right district in true grades and breed relation, and not exploited on this market as indicative of Australia's standard of export quality as a whole, as had been so often done in the past. It must not be overlooked that all countries catering for the English lamb market had a very considerable proportion of lambs lacking conformation and breeding, but intelligent supervision, aided by distribution and excellent publicity, had always prevented any other country's output being assessed in value upon the standards of its lowest grades. The English buyers' wants were approximately as follows:—

1. Down and other crossbreed lambs shipped separately from other breeds.
2. Standardised grading both of weight and quality applied to all States. This would be simplified immensely by the separation of crossbred and other types of lambs.
3. Distribution to avoid gluts.
4. Publicity.
5. Co-operation with all meat companies now financially interested in the development of our industry without losing sight of the protection of the interests of the primary producer.

Cereal Crops, 1936-37.—Acreage Sown and August Conditions.

The Acting Government Statist has received reports from all the more important cereal districts *re* areas actually sown and the conditions of the crop as at the middle of August.

The reports indicate that the total area sown with wheat, barley, and oats is approximately 130,000 acres more than last season, there being an increase of 140,000 acres wheat and 55,000 acres oats, but a decrease of 65,000 acres barley. Compared with the previous season, the grand total acreage is estimated to be 4,450,000 (4,317,146), that for wheat being 3,350,000 (3,210,238), barley 350,000 (414,419), and oats 750,000 (692,489).

Egg-Laying Competitions

Official Single Test conducted at Parafield

Review of the Competition for the month of August, 1936, by M. W. Aird (Asst. Poultry Expert) and A. Clifton (Competition Attendant).

The weather conditions for the first two days in August were of a boisterous nature, and the average production went back a little for a few days. However, the setback was only temporary, and by the end of the month the production had greatly improved.

The daily average of first grade eggs was 266, and of all eggs laid, 301.

Practically all teams competing have at least one bird laying under-weight eggs. There were four deaths for the month, making a total of nine deaths since the commencement of the test.

The outstanding White Leghorn for the month was No. 56, owned by Mr. E. Portlock. This bird laid 28 eggs during the 31 days, including a sequence of 20 eggs in 20 days. A performance of this nature is almost invariably characterised by the eggs laid towards the end of the sequence being under-weight, and this fact was in evidence at the end of the long sequence put up by Mr. Portlock's bird.

Mr. J. Rawe's pullet No. 412 has the best performance to her credit in the Black Orpington class. This bird laid 28 first grade eggs in the 31 days.

David Hart's Black Orpington, entered in the Home Project Section, still has more first grade eggs to her credit than any other pullet competing in the Competition. Her score to the end of August was 125 first grade eggs.

LEADING SCORES TO 30th SEPTEMBER, 1936.—FIRST GRADE EGGS ONLY.

SECTION I.—WET MASH.

Class 1.—White Leghorns—351 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
V. E. Williams	117	109
E. Portlock	115	56
W. Sickert	115	177
Trios—		
W. H. L. Norman	312	307–309
Willow Bend Stud Poultry Farm	307	184–186
A. O. Dawkins	307	85–87

Class 1.—White Leghorns—*continued.*

	Eggs Laid.	Birds Nos.
Teams—		
A. O. Dawkins	576	85–90
Willow Bend Stud Poultry Farm	559	295–300
J. Turner	542	25–30
Willow Bend Stud Poultry Farm	542	181–186

Class 2.—Any other Light Breed (Minorcas)—15 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
V. F. Gameau	78	366
R. M. Yelland	75	371
R. M. Yelland	75	372
Trios—		
Langmaid and Bettison	182	358–360
R. M. Yelland	155	370–372
V. F. Gameau	149	364–366
Teams—		
Langmaid and Bettison	272	358–363
V. F. Gameau	251	364–369

Class 3.—Black Orpingtons—45 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
J. Rawe	106	412
A. G. Dawes	103	377
Willow Bend Stud Poultry Farm	101	384
Trios—		
Willow Bend Stud Poultry Farm	291	379–381
Willow Bend Stud Poultry Farm	286	382–384
H. J. Mills	243	388–390
H. H. Gallagher	243	397–399
Teams—		
Willow Bend Stud Poultry Farm	577	379–384
A. G. Dawes	436	373–378
H. J. Mills	430	385–390

Class 4.—Any other Heavy Breed—36 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
A. G. Dawes (Rhode Island Reds)	103	38
Willow Bend Stud Poultry Farm (Rhode Island Reds)	102	429
Willow Bend Stud Poultry Farm (Rhode Island Reds)	102	424
Trios—		
A. G. Dawes (Rhode Island Reds)	237	421–423
V. F. Gameau (Rhode Island Reds)	232	433–435
Willow Bend Stud Poultry Farm Rhode Island Reds)	225	424–426
Teams—		
K. Pennack (Barnevelders)	411	436–441
A. G. Dawes (Rhode Island Reds)	401	418–423
Willow Bend Stud Poultry Farm (Rhode Island Reds)	401	424–429

SECTION II.—DRY MASH.

Class 5.—White Leghorns—15 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
A. O. Dawkins	118	449
A. O. Dawkins	101	452
A. O. Dawkins	101	453
Trios—		
A. O. Dawkins	296	448–450
A. O. Dawkins	295	451–453
Willow Bend Stud Poultry Farm	264	454–456
Teams—		
A. O. Dawkins	591	448–453
Willow Bend Stud Poultry Farm	451	454–459

Class 7.—Black Orpingtons—6 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
Willow Bend Stud Poultry Farm	108	468
Willow Bend Stud Poultry Farm	94	466
Willow Bend Stud Poultry Farm	84	463
Trios—		
Willow Bend Stud Poultry Farm	272	466–468
Willow Bend Stud Poultry Farm	181	463–465
Teams—		
Willow Bend Stud Poultry Farm	453	463–468

Class 8.—Rhode Island Reds—6 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
Willow Bend Stud Poultry Farm	102	470
Willow Bend Stud Poultry Farm	101	471
Trios—		
Willow Bend Stud Poultry Farm	264	469–471
Willow Bend Stud Poultry Farm	235	472–474
Teams—		
Willow Bend Stud Poultry Farm	499	469–474

SECTION III.—WET MASH.

Class 9.—Any Breed—27 birds competing.
(Home Project Utility Section.)

Name. School. Breed.		
David Hart, Unley High, Black Orpington	126	495
William Horne, Woodville High, White Leghorn	106	490
Anthony Rix, Williamstown, White Leghorn	102	478
Keith Oliver, McLaren Vale, Black Orpington	100	498

Formalin Treated Seed Wheat.

The Secretary of the Shoal Bay Branch of the Agricultural Bureau asks if formalin treated grain will deteriorate if left standing in the vessel in which it was pickled. Mr. R. C. Scott (Chief Agricultural Instructor) says:—

"Grain which is pickled with formalin should be sown immediately, that is to say, whilst still damp, otherwise appreciable damage may occur, resulting in poor germination. This damage is more because of a toughening action on the skin of the grain itself than actual injury to the germ, and therefore the extent of damage if the grain is left standing in the bath will depend entirely on the length of time which the grain is immersed.

If sufficiently long to cause swelling and commence germination, the young tissue is likely to be effected by the pickling fluid, but if this is not the case, it is doubtful if any damage will have been caused, provided that the grain is drilled into the soil shortly after treatment.

The formalin solution itself could stand for some time in the vessel or cask without deteriorating."

Production of Butter and Cheese.

The production of butter and cheese for July, 1936, was:—Butter, 1,087,102lbs.; cheese, 680,958lbs.

Papers Read at Conferences

An Economical and Effective Drafting Yard

[S. B. Castine, Kelly (Kimba Conference).]

A drafting yard is of more importance, even than a shearing shed, because the former is used many times a year to the latter's once; besides which, a bad drafting yard can cause untold damage to sheep and lambs, whereas a "make-shift" shed is more inconvenient to the owner than dangerous to the sheep.

The following yard is one that is in common use in the South-East, the only cost to the farmer is the price of the wire—a few shillings. Ordinary fencing posts are erected around the proposed yard, the posts not to be more than 10ft. apart, less is preferable. Posts to be not more than 3ft. 3in. out of the ground. Half-inch holes are then bored 9in. and 27in. from the ground. One side of each yard is completed at a time. Through each hole, thread two lengths of No. 8 or 10 malleable wire (high tensile wire is not suitable); when threaded, fasten each pair of wires securely to one of the corner posts, leaving at the other end, sufficient slack for the battens to take up when they are inserted. Each pair of wires, at the loose end, is fastened to a fairly heavy log, the log dragged out to make the wires taut. Battens can be made of any timber, but good splitting timber, such as pine, makes the better and neater job. The battens should be 2in. long—this will allow them to be 4½in. below the bottom and 4½in. above the top wires, and will not come in contact with the ground. The timber from which the battens are split, should be sawn both top and bottom; this enables them to be set perfectly level in the line. Battens 3in. x 1in. are a good size, but they may be larger or smaller.

The work is commenced next to the post to which the wires have been made fast. The batten is inserted between the two top wires 4½in. from the top end of the batten, and given a "turn-over" and the other end inserted between the two bottom wires. To get the proper height it can be tapped up or down, and also tapped back as near to the post as it will go. This procedure is repeated, but to get the twist or twitch on the bottom wire from now on, a piece of tapered wood is needed about 4in. x 2in., and with this twist the bottom wires ready to take the batten. When getting near to the next post, the wooden tool is very helpful.

The above process is continued until the end of the line is reached. All this time, the continuous twisting of the wires by the battens has been drawing the two drag logs nearer and nearer the end of the line. When the last batten on that side or portion of the fence is in position, the wires are plugged in the post and disconnected from the drag-logs and fastened around the post, and that section of the fence is finished.

To continue the completion of the yard, each section is done separately, except that the two long "side-fences" can be all done in one operation.

It is a good plan to wire a rail on to the top of the posts to prevent horses and cattle getting over. Yards built this way have been in continuous use for 30 years and have never had to be repaired. The battens being suspended, have a certain amount of give and this prevents the crushing of sheep. Being off the ground, white ants and dry-rot do not affect them.

With the assistance of my two sons, we put up a holding yard to hold 1,000 sheep. From the time we went out to cut the Stringy-bark trees for the droppers, split them out, bored the posts, inserted the droppers and finished the job (which took us just 3 days) the cost, except for labour, was under 10s. for the wire. The gates were also made of split timber.

Classing and Marketing the Farm Clip

[N. G. Stewart, Butler (Kimba Conference).]

As two thirds of the sheep in South Australia are held in the agricultural areas, it is very important that farmers' wool should be classed and marketed in as orderly a manner as possible, and the great number of small flocks makes it very difficult to obtain standardisation in quality.

Wool, being a primary product, needs careful grading in the same way as other primary products, such as butter, meat, fruit, etc. The basis of all grading is to separate the superior from the inferior, and a definite principle must be worked upon to obtain standardisation. Firstly, evenness in length is very important and necessary to avoid waste when the wool is being combed. Soundness of staple must also be considered for the same purpose, and quality must not be overlooked. Wool varies in diameter, and as fine wools are necessary for the manufacture of fine yarn, it is very important to separate fine wool from coarse. Condition of the wool must also be studied, because it is always valued and bought on a clean scoured basis. Colour is also important, as dullness always indicates excessive loss at scouring.

Skirting the Fleece.

Each fleece must be skirted on its merits; some fleeces require much heavier skirting than others. Skirting consists of removing the inferior portions, such as inferior wool from the head and neck, the discoloured and short wool on the points and stains and dags from the breech. When the back wool is definitely inferior, it should be completely removed. If burr is prevalent and can be removed by moderate skirting, do so; if not, skirt lightly, as it usually gathers where the wool is of good length and quality and can best be removed by the manufacturers.

After grading and skirting, it should be baled in as even lines as possible to meet the manufacturers' requirements. This also enables the buyers to value same accurately.

As most farmers' flocks are not over large in numbers, two lines of wool are mostly sufficient and should be branded AA (Mo.) which should consist of good average fleeces of good length (2½in. being minimum combing length), strong in staple, good quality, condition and colour. The second class, mostly branded A (Mo.) should contain the extra short wool, that of unsound staple, dingy coloured wool and heavy in condition or fatty fleeces.

Pack all bellies, pieces and backs separately, or if put in one bale, place a bale cap—a piece of hessian or a large piece of thick brown packing paper—between. This bale of oddments would be sent to the bag pool. Each bale should be neatly finished off and weigh not less than 250lbs.—that being the minimum weight for Merino wool. Brand plainly on the caps and front of bale—for preference on the front about half way down, using stencil plates. If stencil plates are not on hand, a good substitute can be made out of thick cardboard.

With care and attention in grading and packing, a penny a pound better price is usually obtained, and the 25s. a bale, more than pays for the extra care, and also helps to raise the standard of the Australian clip.

Cold Storage of Fruit

[J. H. Martin, Lenswood (Gumeracha Conference).]

The cold store of to-day is a utility, constructed on the principles of modern practice, equipped with up-to-date machinery and controlled usually by capable engineers and efficient management, and if quality produce is handled in a proper manner, the out-turn should, in most cases, be all that can be desired. Occasionally, however, good fruit is mishandled, either through lack of knowledge of the essentials, or lack of attention to details, with the result that some of the fruit, although sound and of good sample, in the space of a short period becomes quite unfit for consumption, showing a heavy loss to the producer.

Time after time these losses have been experienced and commented upon, but poor results are not always the fault of the store operator. They, of course, at times must bear a certain measure of responsibility, through adopting incorrect methods and temperatures, but on the other hand the orchardist is oft-times to blame through lack of care during the harvesting period, as each year the appearance of fruit from some growers—although they are in the minority—is of such poor quality that it appears that little thought or consideration has been given to harvesting and selection.

Care in selection is of primary importance. Fruit from young vigorously growing trees should not be mixed with that taken from well matured trees. The former is usually soft and spongy, breaks down from its own vigour and bulk, and suffers much from handling, as it bruises readily and once the skin becomes broken, it speedily rots. A blemish which is no larger than a pin head when the fruit is first picked, may develop quickly and so be unfit for market later on in the year. It is strongly recommended that strict compliance with these suggestions be observed.

The harvesting and handling of the fruit intended for storage, is one of the problems confronting the grower each season, and it is a matter that needs greater consideration, and much thought should be given to the subject in an endeavour to ascertain the best time to pick and have the fruit at the right stage of maturity. Underdeveloped fruit soon shows signs of wilt, and will be lacking in aroma and flavour, but on the other hand, over-ripe fruit is liable to develop internal breakdown and skin blemish; especially is this so with the softer varieties, particularly Jonathans.

It is admitted that the average orchardist has a very fair idea of the stage of maturity at which he should pick, and relies mainly on general appearance, firmness and colour of seeds, &c., but it is desirable that greater care should be exercised with fruit intended for cold storage than that required for immediate markets. If poor quality fruit is placed in store and held for any length of time, it cannot be expected that the out-turn will in any way be improved. Cold storage does not rectify faults or blemishes.

Pre-Cooling.

This is another matter that can be given quite a lot of consideration, and if adopted, will materially assist in overcoming many of the problems of refrigeration. If this practice is adopted, fruit will give a better out-turn and hold over longer periods than is the case at present.

Some stores have a room or part of the loading platform set apart for this purpose. The temperature is controlled and provision made for ample ventilation, as the incoming fruit is prone to give off a considerable amount of carbon dioxide (CO_2) during these early stages. The fresh fruit at this period is also carrying a great quantity of heat, and it would prove a distinct advantage if this were removed, and so would assist materially in the cooling of the main rooms, and at the same time overcome that bad practice of placing hot fruit alongside that which has been in the store for a considerable period and is down to temperature.

If pre-cooling facilities are available, the incoming fruit should be stored therein for about 48 hours if possible, or a minimum of 24 hours. The stacks should be kept as low as possible and the cases stacked loosely, so that air can circulate freely and percolate through the fruit. If these facilities are not available, the grower can assist materially by harvesting his crop during the cooler hours of the day, by placing it in the open air over-night—weather permitting—and transporting to the store in the earlier hours of the morning.

Pre-cooling does add to the cost of handling, but the better results shown at the end of a long season will amply compensate for this extra cost.

Where growers have to deliver direct to the main storage rooms, it is even more necessary that the fruit be harvested during the cooler hours of the day, but every endeavour should be made to spread the cases over as wide an area as possible, and if circumstances permit, do not stack them one on top of the other. It is a usual practice for growers to deliver to store every other day at the commencement of the season, and at the first delivery, the boxes be spread over the floor as suggested, and at the next visit stacked in their permanent position, the new load being laid on the floor as previously.

By operating in this manner, the fruit is given the opportunity of getting rid of the surplus gas and heat. If a large quantity of fruit, say a block of 500 cases, at atmospheric temperature was placed direct into store and stacked, it would surprise many to know of the rise in temperature that could be indicated after a period of 12 hours, even though the air temperature of the room may show a comparatively low reading.

Stacks in these rooms should be ventilated as much as circumstances will permit, and in direct expansion rooms particularly, it is essential that floor battens be provided, and 1in. square cleats placed on the top of each case, and so allow a free movement of air. Because the use of these battens or cleats gives extra space, it does not follow that this is to be used for extra fruit, otherwise the object for which they were placed there would be defeated. Do not stack close to ceiling or walls.

Once the fruit is in the store the attention is then in the hands of the engineer, and his job is to so control the temperature, humidity and ventilation, and it is the knowledge of these principles that denotes either success or failure.

It has been determined with a certain amount of accuracy, the temperatures required for the different varieties of fruit, but this factor is governed to a large extent by the condition of the fruit, and also the climatic conditions that have prevailed during the period of growth, especially just prior to harvesting.

It does not follow that one set of conditions, for a particular variety of fruit, will apply directly, each and every season, and this is where the skill and knowledge of the engineer play an important part. Bear in mind that commercial refrigeration is but half a century old, and it takes a long while to train experts capable of solving the many and varied problems that arise. It is a pleasure to know that definite progress is being made and difficulties gradually overcome, due mainly to the individual and collective efforts of a body of practical and scientific investigators who record their acquired knowledge for the benefit of those who seek it.

Much has been accomplished, but a far wider knowledge is still essential before that stage of perfection is reached that will give complete satisfaction both to the store management and to the producer, and it is the duty of those vitally interested in these matters to assist wherever possible in their solution.

Do not lean too heavily on governments; the industry must carry the greater part of its own burden, and by co-operation, coordination and organisation, be able to tabulate and classify the results of our labours for the benefit of the community in general and this industry in particular.

Sheep

[A. L. STARKLEY, Mount Pleasant (Gumeracha Conference).]

The Foundation and Management of a Flock.

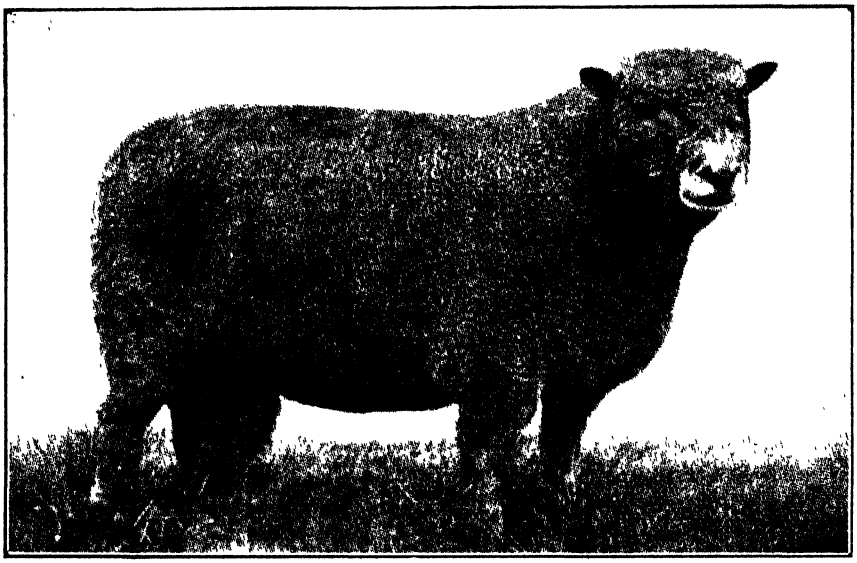
The first thing to do is to get a line of good ewes. The purchase of these is often very difficult; it is not a good proposition to go to a sale and buy the first line of ewes offered. It is far better to wait until a line that has been forced on to the market by drought conditions or some other conditions over which their owners had no control. Before purchasing any, it is a wise plan to seek the advice of one who has made a success of sheep breeding, as to what particular breed is best suited to your country. If situated in a very heavy rainfall, select a Corriedale or some British breed, but if in drier country then the bold type, strong wool, South Australian Merino has no equal. If no good lines of young ewes are procurable, the next best plan is to buy "cast for age" ewes from a prominent breeder, or a registered stud breeder of the particular type decided on.

Breeding.

Before mating, be very careful to grade or class them into as even a line as possible. In the case of a Merino flock, always remove those that are short in the staple and over-developed with body wrinkle. In most cases, these sheep are very short in the legs, which also makes removal necessary. With British breeds, wool is only a secondary consideration, most attention being paid to a sheep that will produce a carcass which when cut up, will consist of the biggest proportion of expensive joints.

There is only one class of sire to buy, and that is the very best one can afford. It is far better for a beginner, who usually has not too much cash to start with, to buy within his means and work up the flock and add better as circumstances permit. Not every sire will prove a success, and if it happens to be a very expensive sire and the mating does not prove satisfactory, very often the beginner becomes downhearted and disposes of the whole flock at a loss.

When selecting a sire, if possible buy from a registered breeder. Remember that every registered flock is backed up with stock that have been carefully selected and heavily culled for years. Choose a sheep with a strong constitution. If the flock is of Merinos, buy a strong-wool, large-framed, big, open-bodied ram, free from body wrinkle, but having a good bold front or neck with no collar folds. The legs and feet are very important. Be sure he stands square on all fours and not cow-hocked, with his hind quarters brushing like a tired horse.



Southdown Ram

The Wool.

I suggest a bold commercial wool of 58's count and a good staple 4 to 5in. in length. Do not be over-anxious for the longest staple, for the longer the staple the thinner the wool. A fairly dense sheep with a medium staple will always cut more wool than the one just mentioned. The horns are also very important. In the case of a Merino, see that they are not too close to the head. They should be of a robust nature, leaving the head together, and having room to get one's hand between the head and the horn, and should have about a turn and a half after the ends have been cut. In the case of most British breeds, horns do not count much, except with Dorset Horns.

Dipping should be done at least a week before mating. Keep a watch, if possible, to see that the ram mates with the ewes and does not go and stand in a corner. Sometimes rams that have been bought and taken to a fresh place will do that, especially if they have been hand-fed to any extent. The British breeds are generally the biggest offenders at this. If it does happen try and yard the ewes for a few nights until the ram starts to work. The time to leave a ram with the ewes is usually about 6 or 7 weeks. If the flock is large enough, put a fresh ram in for about a fortnight to catch any ewes missed. The mating season over, take the rams out and place them in some paddock to themselves, where they can be given a little extra feed by hand if pastures are short. The ewes should be kept in as good a condition as possible. If they start to slacken in condition, commence hand feeding 3 or 4 weeks before lambing. This can be done by feeding with grass hay, ensilage, hay chaff and oats, or any other fodder that grows on the farm. Specially prepared foods are usually to expensive. Fodders grown on the farm can be used without any additional outlay.

The Lambing Season.

Keep a close watch over the ewes to see that none get down. If any leave their lambs, there is a better chance of getting them to suck if a lamb is found that has been left and is cold. First warm it by the fire before trying to get it to suck the ewe. When the lambs are about 4 or 5 weeks old, they should be tailed and marked. If the lambs are Merinos, tail them fairly short, removing any bad tail folds or wrinkles. This can be done at this time of the year, with a pair of sharp sheep shears, and by shearing time, the wounds should be properly healed.

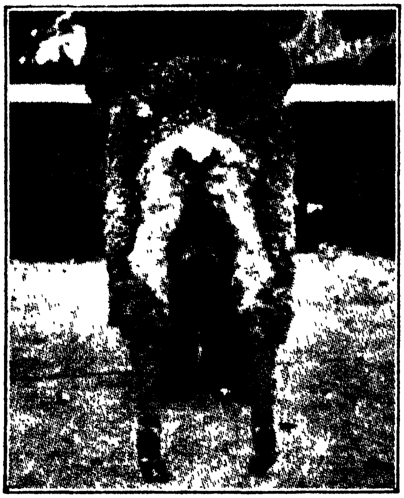
With regard to marketing, if a registered ear-mark, mark the ewe-lambs on the left ear and the wethers on the right. If no earmark is registered they can be done on the opposite ear. When tailing lambs of British breeds, and especially lambs for export, leave a fair bit of tail, and try to get each one as even in length as possible, because when yarded for sale, they have a better appearance, and always catch the exporter's eye. When lambs are about 35 to 40lbs. dressed weight is the best size to sell them. With Merinos, the lambs have to be shorn about September or October, and left with the mothers until the ewes are dipped and mated again, say about the beginning of November. When weaning Merino lambs, mix them with some older sheep in about even numbers until they settle down. This will prevent them from getting huddled up in a corner, and the older sheep will lead them to water. Going without water, grass-seeds and blowflies are the three biggest troubles that confront a Merino lamb after being weaned. They

Long-Wool Merino half-bred ewe.

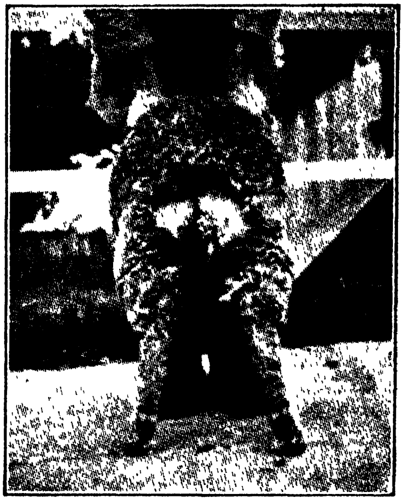
should be looked to as soon as the grass-seeds are out, to see if they have any seeds in their eyes. Remove all seeds from under the chin; the heel of the shears will be found a good thing to loosen them with.

The Blowfly.

The blowfly is the biggest pest that the sheepman has to deal with at certain times of the year. The worst period is generally from October to the end of November, and again about April and May. There are certainly some deterrents that will prevent sheep from being struck for a while, but the real cure has yet to be found. The small green-fly is the one which causes sheepmen so much trouble. Keep the sheep well crutched around the tail. Merino hoggets should be cleaned not less than 4 times a year, and if heavily-wooled, a great deal more often. If any are fly-blown, attend to them immediately; muster the whole flock and try not to leave any infested sheep behind, because the fly will follow those. Always clean the whole flock, or the fly will soon strike those not cleaned. If any animals die, bury or burn them, and so keep the paddocks clean. There are numerous ways of treating infested sheep. The best home-made preparation is to mix tar, kerosene and old oil drained from the crank case of a car in equal quantities and apply the mixture to the blown patch with a brush or swab.



Crutching, the correct way.



Crutching, the incorrect way

Advertising Fruit in Australia

[R. A. Cramond, Lenswood (Gumeracha Conference).]

It is not realised by all Australian growers that the most important thing needed is a definite advertising campaign to increase the consumption of fruit in this, the best market. If Australians ate ½ an apple per day per head, there would not be enough grown in the Commonwealth to supply the demand, and there would be none left for export. Some growers think that advertising would be an added expense, but it would be a gilt-edged investment.

Advertising is recognised by leading business men as an essential business expense, and it is taken into account just as rent, wages and general expenses. What business man to-day sets about building up a huge production without adequate means of disposing of goods produced? Growers have not yet fully realised that they are yearly increasing production, and are not making adequate provision for selling these excellent goods. On recent figures, it was shown at the last meeting of the Apple and Pear Council that in addition to visible supplies of apples, a further 23 per cent. was yet to come into bearing, this in apples only. On top of low overseas prices, which must have a tendency to encourage growers to retain more fruit for the home market, further seasonal factors have resulted in comparatively light crops in Australia.

At a recent interstate conference, evidence tended to show that the consumption of fruit was declining. This is a very serious factor. No figures were available, but the unanimous opinion of the trade was that buyers were not obtaining the same quantities of fruit as previously. One reason for this is that well advertised proprietary lines of prepared foods, &c., are cutting into the amount the average housewife has to spend on fruit. The need is thus to retain the present market, as our goods will not sell themselves against well advertised goods. On top of this there are large increases in production in view. In Victoria recently there was a "Drink More Milk" campaign, and official figures show an increase in consumption of milk by 12½ per cent.

A report of last season's modest advertising campaign by the Apple Sales Board of Western Australia showed a satisfactory increase in the sales of cooking apples; other methods are now being devised to increase sales of dessert varieties.

At the recent Interstate Conference previously referred to, Mr. C. G. Savage, Director of fruit culture in New South Wales, stated that the consumption of apples in the United States of America was 62lbs. per head per annum, as compared with 32lbs. in New South Wales. Prior to the intensive citrus advertising, the consumption of apples had been 72lbs. per head, and citrus, 29lbs., but the citrus advertising campaign had made the figures 42lbs. for citrus and 62lbs. for apples; the total consumption of fruit had increased from 185lbs. to 190lbs. per head.

The "Eat More Fruit" campaigns in England have doubled the consumption of fruit there. With these examples, growers must realise that the immediate need is a definitely planned advertising programme. This does not just mean poster and newspaper advertising, but would include lectures on "Fruit in the Diet," in schools, literary articles on fruit and health, "The Care of the Teeth," with suitable and convincing pamphlets backed up by medical and dental evidence, suitable wireless talks, special trade window displays, fruit weeks, slogan competitions and all the known methods of efficient publicity. What is needed is a Fruit Sales Board, composed mostly of alert growers, who could go thoroughly into the sale and distribution of fruit and give concrete recommendations which could then be put into effect by legislation or voluntary effort by the growers and trade generally. This matter is now occupying the minds of all thoughtful growers and will most likely be further discussed at the forthcoming Apple and Pear Export Council Conference in Adelaide in October.

Breeding of Pigs

[O. G. Ayton, Adelaide (Gumeracha Conference).]

Boar.

The boar occupies a prominent place in the breeding of pigs, and I advise the keeping of a pure breed of any type. The type most suitable for present requirements is a long lean boar, with a good depth of body and fineness of bone. The boar should be selected from a large litter. He should always be kept in good condition, and given plenty of exercise in an open yard with good housing. The boar should not be mated with sows until he is at least 6 months old, and not allowed to run with the sows indiscriminately.

Sow.

Sows also should be selected from large litters, should have at least 12 teats, and be of a quiet nature. Do not start breeding from sows too young, it checks growth, and usually results in a lot of small mothers. The first cross, the progeny of pure bred parents, makes good mothers. Sows do better if they are run in paddocks, brought about 3 weeks before farrowing and kept in a good, warm pen with guard rails to protect the young pigs Keep the sow in good condition and do not let her get too fat. After farrowing, the sow requires very little food for the first day or two, and her food should be increased as the young pigs grow. The pigs should be weaned at 7 or 8 weeks old. When they are one month old, try to feed the young pigs apart from the sow. They will get on more quickly and will not be such a drag on the sow. At farrowing time, do not give the sow too much bedding—the shorter the straw the better. Keep the sow and pen as clean as possible just before farrowing. Remove and destroy all deformed and puny pigs.

Young Pigs.

After the young pigs are weaned, they should be run in paddocks with a good dry shelter, free from draughts. If possible, milk should be added to their food. Feed as often as possible for the first two weeks. When pigs are well grown they can be brought into small yards or pens and finished off for market. A bacon pig will be required to be a long animal with a deep body and not too fat, weighing from 115 to 130lbs.

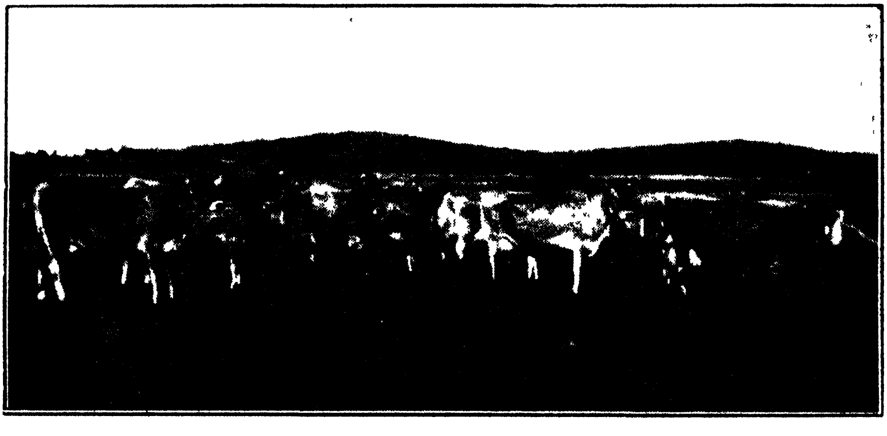
Dairying on Sound Lines

[V. Gurr, Lobethal (Gumeracha Conference).]

To be successful in dairying, a man must have many attributes; but above all he must be a good judge of the dairy cow. No one can tell from the appearance of the cow, how much butterfat she will yield.

This has been demonstrated repeatedly ever since herd testing began. The only reliable guides are the scales and Babcock testing. Unfortunately, however, cows cannot always be purchased on their test record, and in purchasing new blood or building up a herd of his own, the dairyman who has a sound knowledge of the essential points of a dairy cow will make fewer mistakes than the man who has not the knowledge.

It is important that a dairyman, in purchasing stock, should bear in mind clearly the thoroughly proven value of the dairy type animal, that is one showing capacity for the consumption of feed, with square and angular form denoting absence



of too great a flesh forming tendency, with udder and milk veins developed adequately to balance the other parts of the body and an alert temperament and good constitution.

The prospective dairy farmer who already has on hand a herd of good, fair and indifferent grades of no particular breeding should bear in mind, first, that it is a very poor cow indeed which is not better than no cow at all on the farm; that cows vary in their ability to return profit and that life is too short to make it wise to plod along with the inferior cow.

Working on this basis the dairyman who has a mixed herd of unknown quality should keep the animals until such time he has good evidence to prove, through testing, that certain members of the herd should be disposed of and raise his stock from the better half of his herd.

The Sire.

To improve such a herd a strong-blooded bull of the breed desired should be placed at the head.

The first points looked for in selecting a bull are, constitution, thrift, masculinity, and trueness to breed type.

The next point is the matter of record or power of performances on the part of dam and grand dam and as many other generations back of this as possible, such an animal, in addition to having the prepotency of pure blood, will have a strong individuality which will increase the likelihood that his daughters will resemble his mother and grandmother in ability to produce abundantly.

Giving the Cow a Rest.

The conversion of feed to milk every day is very exhausting to the cow's system. When to this is added the burden of the growth of the calf, a very considerable amount of work is being done. In order that the calf may be amply nourished and born strong, and that the cow herself may have recuperated in flesh—sufficient to enter upon a new lactation period strongly—it is advisable that the cow be given up to 8 weeks rest.

The dry cow should be looked upon as a prospective milker, not as a mere boarder. If she should be run down, sufficient feed should be given to her to regain her normal condition.

Care after Calving.

The strain upon the cow's system due to calving brings on some fever and nervousness. She should be left alone until she has had time to lick the calf, and the calf to learn the use of its legs.

The cow may be permitted to suckle the calf once or twice, and then taken away out of sight. The first milk drunk by the calf from the bucket should be a portion of the mother's milk, sweet, warm and clean, and not more than 3 pints in quantity. In teaching a calf to drink remember that the calf is a baby and cannot be anything else until given time to grow. The struggles occasionally pictured in teaching the calf to drink, exhibit the ignorance and impatience on the part of a man.

During the period of about three days when the cow is yielding colostrum milk portions of such should be fed to the calf.

The milk fed must be sweet, warm and from a clean bucket and not too great in quantity, otherwise digestive disturbances are liable to occur.

The quantity of milk given to the calf for the first month should be 4 pints of fresh milk twice a day. Skim milk may then be given. It is very important that the change made be done gradually. Clean water must be available. Shelter is absolutely necessary.

It is also recommended that calves intended for dairy purposes be encouraged to eat grass hay as young and as freely as possible.

Pastures.

Top-dressing is of the greatest importance in pasture management. Pastures should receive at least 2cwts. per acre of superphosphate, preferably spread out in two lots, 1cwt. in March and the other in August.

The timely use of grass harrows limits the development of rank growth caused by the undisturbed droppings of stock and it is in the distribution of animal droppings that grass harrowing does its best work. Where rotational grazing permits of heavy stocking, fairly frequent light harrowings are advisable, but results follow when the treatment is given before all the fertilizing elements have been washed out of the animal manures into the soil. Regular grazing of a pasture is desirable.

In making grass hay the main points to aim at are to produce sufficient drying in the crop to prevent fermentation setting up to any extent afterwards, and to do this without the crop having been spoiled in any way by weather influences such as continuous rains.

Hay should not be allowed to dry too much, and crops should not be too ripe. A perfect hay is one that is cut at the proper time; when the plant contains the most nutriment, together with succulence and saved in such a manner that the drying process is just carried far enough to prevent the hay fermenting to any extent when stacked later on.

Ensiling a fodder means preserving green succulent plants so that they will remain green or semi-green and keep their succulence for a considerable time.

The crop should be cut and carted at once to the stack.

Clean Milk Commandments.

1. Keep the cow's flanks and udder free from dirt, far more dirt gets into milk from this source than from any other. Clipping the flanks and udder makes this easier and more certain.

2. Wipe the udder with a moist cloth, for this keeps loose hair, &c., from dropping into the pail.

3. Use a small top milk pail, for it is added protection against dirt and has proven its worth.

4. Use flannel or a cloth pad strainer, for wire or cheese cloth strainers are a delusion.

5. Pails, cans, and bottles should be rinsed with cold water, washed with hot water and a washing powder, sterilised with boiling water or steam or by use of a chemical steriliser, and then drained and thoroughly dried out by heat or sun.

6. Rinse each utensil with clean water before using, for this will remove any dirt that may have entered since washing.

7. Milk with clean, dry hands, for wet hand milking is filthy and injurious.

8. Cool the milk to 60 degrees or below immediately after milking and keep cool, for this is one of the best methods for keeping bacteria from multiplying.

9. When delivering milk in hot weather, cover cans with a wet blanket to keep off the direct heat of the sun; the evaporation of the moisture helps to keep the milk cool.

10. Drive disease from the herd and keep the barn clean and whitewashed, for these things are not only bad in themselves, but also lead to a disregard of the previously given commandments.

Yacca Country.

Some Reasons why we should endeavour to clear our Scrub Blocks

[F. C. KEEN, Port Elliot (Inman Valley Conference).]

From time to time papers have been read and questions asked concerning the improvement or bringing into better use of scrub land. The Mallee Scrub has a rainfall of under 20in. and has proved suitable to wheat production and farming generally. On the other hand, there is in districts of over 20in. rainfall a scrub land that so far has not been so speedily brought into profitable use as in the drier scrub lands. It is this scrub land with the heavier rainfall that the members of the Agricultural Bureau in this district are concerned with, and more or less have had experience with.

Landholders cannot keep scrub land without some expense attached to it. They are obliged to pay rates and taxes, as well as fence such land, which in the long run proves expensive on account of fires that sooner or later do damage to the fencing. If the scrub land is not netted off from the grassland, rabbits are supplied with shelter and breeding grounds and invade the grassland for food. The stockowner does not only lose the grass the rabbit has eaten, but stock do not appreciate grazing that has been run over by rabbits. If scrub is cleared, the rabbits will gradually be driven back until they come to the stony land, where they may be netted in and starved out or trapped. The pioneers of scrub grazing found that by burning the scrub every five or six years they were able to keep one sheep on from 7 to 10 acres of the burnt scrub. That practice in a measure proved profitable. There has, however, been shown to-day a more profitable method which should concern scrubholders—the advent of superphosphate and Subterranean Clover.

Rainfall.

In a district with over a 20in. rainfall it is possible to treat scrub land so that it will carry from one to three sheep to the acre. The proved combination of rainrall, superphosphate and Subterranean Clover is the chief reason for saying that the present holders of scrub should endeavour to bring the scrub gradually into good grazing ground. It has been said that a rainfall of over 20in. has proved too much. For some purposes it has, but it must be recognised that superphosphate for top dressing cannot give full results without moisture, and where superphosphate will not act, then clover will not respond. Superphosphate and clover will not give successful results without good rainfall.

In scrub country, if there is not water in every gully, there are small swampy patches that enable stock to be watered in almost every paddock. If stockowners in this district were obliged to bore for water or sink wells and supply windmills and piping or other machinery for lifting stock water, they would have found it no small expense with an added amount of attention, for no mechanical device will give satisfaction without attention, which means time. Those who have seen something of drought know how pleasing it has been to go to the well and find water, but how depressing and how expensive it proves when rain falls, the well becomes dry and stock have to be moved to feed and water. Our rainfall is worth something and it is our business to use it to advantage. Therefore, we must count rainfall as No. 1 in the combination with superphosphate and clover as an agricultural practice.

Superphosphate.

Superphosphate, the "second in command" in this combination, has proved valuable to stockowners in improving pasture and encouraging clovers in districts with over 20in. rainfall. What would be thought of the wheatfarmer today who would refuse to use superphosphate? It may be there are still a few stockowners to-day who are doubtful whether top dressing pays. I cannot give from experience any figures that will throw any light on the actual cash results of top dressing, but am convinced that, taking a period of three years, those that top dress will be well repaid with better grass paddocks, if not carrying more stock, at least carrying larger framed, better built and better conditioned stock, carrying more wool with better lambs. The same applies to larger stock; they look better, lose the triangle or three-cornered appearance and improve at the bucket. Horses worked when grazing only and not stabled usually shown sigs of softness. Since top dressing I have been able to work the horses straight from the paddock. During October, November and December they have worked well without any sign of softness. Super must now be taken into consideration in dealing with scrub land.

Clover.

The third reason given to encourage the taking up of scrub blocks is the fact that Subterranenan Clover has proved the king of plants for the purpose; its success depends on rainfall and superphosphate. It being a legume, it gathers nitrogen from the air and returns this essential plant food to the soil. Subterranean Clover being an annual, the roots in decaying each year supply a valuable amount of humus to the soil. It is a prolific seeder, and all things being equal, once it is established it may be said to be permanent. It does not bury all its seeds, thus large stock are able to carry and spread the seed to a great advantage.

Last, but not least, it can be said that Subterranean Clover is a fodder of first rank, and when we have it growing will be raking it and stacking it in the form of hay for winter use.

It will be proved that in dealing with scrub, the cultivator or sharp stump-jump harrows will serve in place of the plough for the first three to five years. It will, of course, be necessary to cut the scrub and get as clean a burn as possible, as in the case of ploughing the cultivator does not destroy the natural feed, which will, with top dressing of superphosphate, provide grass right away and while clover is establishing itself. The cultivator will destroy some undergrowth and shoots, and stock will be encouraged to eat more readily the edible bushes because of the superphosphate. It takes from five to seven years for the scrub to get thick enough to burn. A crop of clover will grow in 12 months; a better will result the second year and in the third year the clover will smother most other plants. Scrub treated in this way and not ploughed will, in three years, provide more feed at a less cost. One cannot plough without ploughing too deeply, thus destroying the natural grasses and burying ashes and the small amount of humus too deep to be of use to the first seeds sown. The soil turned on top by the plough is sour and contains little or no humus, with the result that the bacteria necessary to successful plant growth cannot live, because their life depends on humus. The

Supplement to the Journal of Agriculture, South Australia, September, 1936.]

Herd Testing Results

A Record of—

1. Production figures, under Official test, of pure bred cows which completed their tests during the half-year ended 3oth June, 1936.
2. Annual production figures (not official) of the Hills Herd Testing Association, 1935-36.
3. The "Gold Medal" Competition inaugurated by the South Australian United Stud Dairy Cattle Breeders Association.

Pure Bred Cows which completed Official

Herd Book No	Name of Cow.	Owner and Address.	Breed.	Calved.
			JUNIOR TWO-YEAR-OLDS—	
Not allotted	Tuela Danthonia	F. Coleman, Saddleworth	Jersey	13/7/35
50238	Pulluwewal Duchess Flavia 2nd	Mrs A. Bowman, Meningie	"	18/9/35
Not allotted	Murray Glen Griselda Buttergirl	C. J. Morris, Monteith	Friesian	6/8/35
"	Glen Belah Dorah	E. O. Hancock, Andrews	Ayrshire	2/4/35
44208	Greenoaks Sweet Kate	W. A Mueller, Ambleside	Jersey	23/6/35
50412	Rivington Seal	J W Crompton, Victor Harbour	"	13/6/35
Not allotted	Ninyeri Bluebell	E L Goode, Narrung	"	16/6/35
50954	Tuela Rosemary 2nd	F. Coleman, Saddleworth	"	19/6/35
49093	Lanacoona Maglona	C E. Verco, Mount Compass	"	8/7/35
Not allotted	Ninyeri Heather Bell	E L. Goode, Narrung {	"	12/5/35
			"	12/5/35
Not allotted	Scrub View Dora	A. B A. Weckert, Brinkworth	"	15/4/35
50320	Raglan Melba	D. Fitzgerald, Edwardstown	"	21/8/35
Not allotted	Glen Belah Sylvia	E. O. Hancock, Andrews	Ayrshire	3/5/35
43584	Cumberland Princess Rhonda	L. W Frost, Saddleworth	Jersey	6/9/35
49095	Lanacoona Mercedes Queen	C E Verco, Mount Compass	"	29/7/35
Not allotted	Roseworthy Sunbeam 2nd	Agricultural College, Roseworthy	"	7/7/35
"	Brinkworth Lupin	C. C. T. Ottens, Brinkworth	"	2/4/35
43543	Crotton Alannah	H. and A. Bohme, Balhannah	"	1/5/35
49656	Morella Socurette's Trilby	H. R. Walsh, Mount Barker	"	24/7/35
50949	Tuela Camellia	F. Coleman, Saddleworth	"	12/7/35
50052	Palpara Hero's Lupin	Mrs. C. E. Mayger, Kapunda	"	3/5/35
Not allotted	River Glen Dulcie	D. A. Collins & Sons, Sutton Town	A.I.S.	31/8/35
"	Roseworthy Bramble	Agricultural College, Roseworthy	Jersey	28/7/35
50053	Palpara Ruth	Mrs C. E. Mayger, Kapunda	"	4/6/35
46294	Sweet Haven Bloom 5th	J. M. Bray, Langhorne's Creek	"	12/8/35
48579	Gum Hill Nancy	P. O. Schutz, Eudunda	"	1/5/35
47442	Brinkworth Rosette	C. C. T Ottens, Brinkworth	"	6/9/35
46293	Sweet Haven Bloom 4th	J. M. Bray, Langhorne's Creek	"	28/7/35
Not allotted	Delma Sybil's Snowdrop	E W. Pfitzner, Eudunda	"	22/8/35
11980	Kiama Bess 7th	E. and A. Nicholls, Woodville	A.I.S.	18/7/35
43615	Delma Dutch Lass	E. W. Pfitzner, Eudunda	Jersey	11/6/35
43616	Delma Sweet Bread	E. W. Pfitzner, Eudunda	"	18/6/35
50953	Tuela Orchid	F. Coleman, Saddleworth	"	12/8/35
Not allotted	Alexandra Bluebell	A. Kelly, Milang	"	30/7/35
44719	Kirami Rosy Morn	R. J. Laing, Gumeracha	"	8/4/35
Not allotted	Lallawa Carnation's Mystify	J. F. Dodd, Meningie	"	21/9/35
50950	Tuela Daphne 2nd	F. Coleman, Saddleworth	"	15/7/35
Not allotted	Hampden Blonde's Justice	J. A. J. Pfitzner, Hampden	"	3/7/35
44206	Greenoaks Lotus	W. A. Mueller, Ambleside	"	18/6/35
48618	Hampden Olive's Gem	J. A. J. Pfitzner, Hampden	"	1/8/35
50050	Palpara Colleen	Mrs. C. E. Mayger, Kapunda	"	12/7/35
49653	Morella Golden Fountain	H. R. Walsh, Mount Barker	"	10/9/35
12932	Newenham Rosemary	J. M. Irwin, Mount Barker	A.I.S.	2/5/35
Not allotted	Glen Ewin Molly Mytilda	Agricultural College, Roseworthy	Jersey	20/9/35
43582	Cumberland Lilly	L. W. Frost, Saddleworth	"	28/8/35
51327	Wooroora Marcia	A. B. Sieber, Eudunda	"	23/8/35
43581	Cumberland Lassie	L. W. Frost, Saddleworth	"	2/7/35
50731	Sweet Haven Carnation	J. M. Bray, Langhorne's Creek	"	19/9/35
Not allotted	Greenoaks Rhodora	W. A. Mueller, Ambleside	"	18/8/35
"	Lallawa Mystery's Mystic	J. F. Dodd, Meningie	"	15/8/35
46297	Sweet Haven Flower 3rd	J. M. Bray, Langhorne's Creek	"	9/8/35
50061	Para Vale Millie 4th	A. J. Marrett, Saddleworth	"	29/7/35
Not allotted	Mira Chana Capture 2nd	H. B. Peters, Mount Compass	"	9/6/35
"	Alexandra Ruby	A. Kelly, Milang	"	26/8/35
48578	Gum Hill Lady Starbright	P. O. Schutz, Eudunda	"	14/8/35
48576	Gum Hill Audrey Lotus	P. O. Schutz. Eudunda	"	9/8/35
48614	Hampden Gamboge's Lilac	J. A. J. Pfitzner, Hampden.	"	20/8/35
47792	Crofton Felicity Kate	H. and A. Bohme, Balhannah	"	21/6/35
12317	Long Flat Lucy 4th	Mrs. A. H. Spackman, Long Flat	A.I.S.	18/9/35
13042	Northfield Fairy	Inspector-General of Hospitals, Northfield	"	18/8/35
Not allotted	Rivington Maple	J. W. Crompton, Victor Harbour	Jersey	13/6/35
50058	Para Vale Lady McEwin 5th	A. J. Marrett, Saddleworth	"	17/8/35
9963	Clover View Primrose	P. J. A. Braendler, Ambleside	A.I.S.	13/9/35
Not allotted	Kyby Snowgirl	Government Farm, Kybybolite	Ayreshire	8/7/35
47871	Delma Silver Bouquet	E. W. Pfitzner, Eudunda	Jersey	14/8/35
Not allotted	Kyby Alice	Government Farm, Kybybolite	Ayrshire	10/6/35
47410	Brinkworth Juanita	C. C. T. Ottens, Brinkworth	Jersey	14/8/35
Not allotted	Roseworthy Lady 6th	Agricultural College, Roseworthy	"	24/7/35
12315	Long Flat Joyce	Mrs. A H. Spackman, Long Flat	A.I.S.	5/4/35
46954	Alexandra Jessica	A. Kelly, Milang	Jersey	10/5/35
Not allotted	Kyby Rosamund	Government Farm, Kybybolite	Ayrshire	12/9/35
12323	Long Flat Mermaid 7th	Mrs. A. H. Spackman, Long Flat	A.I.S.	7/8/35
Not allotted	Roseworthy Scient	Agricultural College, Roseworthy	Jersey	10/8/35
"	West Kilbride Waitress	Inspector-General of Hospitals, Northfield	Ayrshire	28/7/35
28512	Gowrie Park Novice	Inspector-General of Hospitals, Northfield	"	24/9/35
Not allotted	Kyby Hazel	Government Farm, Kybybolite	"	8/9/35

Test from 1st January to 30th June, 1936.

Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs			
BUTTERFAT STANDARD, 230LBS.						
1 9 6	8,262	6 02	497 63	273	Para Wirra Percy	—
1 11 14	7,676	5 51	423·10	273	Wooroora Pearl's Cavalier	—
2 5 13	9,768	4·00	391·00	273	River Glen Lord Echo Griselda	—
2 5 27	8,932½	4·34	387 98	273	Kyby Robin	—
2 0 24	6,903	5 57	384 79	273	Pella Cleg Kelly	—
1 11 23	6,667½	5 52	368·18	273	Melford's Butter Lad of Pella	—
1 9 5	6,087	6 04	367 39	273	Hampden Mayflower's King	—
1 10 15	5,658	6 45	364 90	273	Tuela Hercules	—
1 8 24	5,550	6 49	359·92	273	Para Wirra Pretty Noble	—
1 9 24	6,972	5·14	358·52	273	Ninyeri King	—
1 9 24	7,485	5·20	389·02	300		
1 10 8	6,423	5 47	351·21	273	Scrub View Twylish Lad	—
2 4 13	6,694½	5·20	347·99	273	Glen Echo Kelly's Lad	—
1 10 0	8,418	4 11	345 90	273	Kyby Robin	—
2 2 25	5,985	5·72	342·41	273	Para Vale Prince 2nd	—
1 10 7	6,234½	5·18	322 99	273	Timbungalung Larkspur's Masterlark	—
2 2 21	5,736½	5 55	318·61	273	Roseworthy Pretty Duke	—
2 1 5	5,421	5·82	315·34	273	Havec Star	—
1 9 25	6,148½	5·10	313·63	273	Glen Ewin Morn's Starbright	—
1 10 25	5,863½	5·25	308·12	273	Soeurette's Fountain Lad	—
1 11 7	4,881	6 26	305·33	273	Tuela Hercules	—
1 10 7	5,961	5·10	304·03	273	Wooroora King's Hero	—
2 3 22	7,290	4·16	303·42	273	Wangara Dorrie's Royal	—
2 2 16	5,172	5·87	303·40	273	Roseworthy Sprite	—
1 10 16	5,643	5·34	301·55	273	Wooroora Kings Hero	—
1 11 17	6,756½	4·43	299 41	273	Dalebank Wizard	—
2 1 16	5,223	5·71	298 13	273	Pella Northwood Cavalier	—
1 5 6	4,720½	6 31	298·06	273	Havec Star	—
2 0 3	6,424½	4 63	297·75	273	Dalebank Wizard	—
1 11 25	5,086½	5·79	294·43	273	Woodside Agatha's Gamboge	—
2 3 9	7,306½	4 01	292·89	273	Viscount of East View	—
1 10 25	5,202½	5 58	290 08	273	Woodside Agatha's Gamboge	—
1 11 9	5,012	5·75	288·28	273	Woodside Agatha's Gamboge	—
1 11 4	5,260½	5·47	287·98	273	Hampden Winsome King	—
1 11 28	4,593	6·21	285·38	273	Timbungalung Bluebell's Masterpiece	—
1 11 1	5,442	5·19	282 71	273	Glen Ewin Coutance's Masterman	—
1 9 21	4,987½	5·66	282·34	273	Dalebank Mystifier	—
1 11 16	4,608	6·08	280 34	273	Hampden Winsome King	—
1 10 3	4,605	6·08	279·82	273	Bellefaire Blonde's Aristocrat	—
1 10 7	5,271	5·31	279·75	273	Dalebank Commander 2nd	—
1 7 11	4,932	5·67	279 69	273	Woodside Agatha's Gamboge	—
1 11 3	4,887	5·69	278·01	273	Wooroora King's Hero	—
1 11 4	4,590	5·99	274·73	273	Soeurette's Fountain Lad	—
2 0 11	7,417½	3·65	271·01	273	Kiama Joffre	—
2 2 4	4,479	5·95	266·45	273	Glen Ewin Coutance's Masterman	—
2 2 5	4,941	5·38	265·61	273	Para Vale Prince 2nd	—
1 6 14	4,995	5·29	264·41	240	Bellefaire Blonde's Signal	Sold
1 9 2	4,969½	5·31	263·90	273	Para Vale Prince 2nd	—
1 8 5	5,136	5·12	263·03	273	Dalebank Wizard	—
1 9 17	4,740	5·51	261·24	273	Dalebank Commander 2nd	—
2 1 28	4,755	5·48	260·52	240	Dalebank Mystifier	†
1 10 8	5,577½	4·66	260·09	273	Dalebank Wizard	—
1 11 28	4,948½	5·24	259·29	273	Para Wirra Percy	—
1 9 4	4,299	5·95	255·98	273	Werribee Masterstroke	—
2 1 24	4,719	5·37	253·54	273	Hampden Queen's Repeater	—
1 10 17	5,274	4·76	251·16	273	Melvin Noble	—
2 3 2	4,938½	5·06	249·68	273	Pella Northwood Cavalier	—
1 8 12	4,509	5·52	248·94	273	Woodside Agatha's Gamboge	—
1 8 27	4,969½	5·00	248·69	273	Glen Ewin Morn's Starbright	—
2 1 24	6,006	4·12	247·62	273	Wangara Ruth's Limelight	—
2 4 24	6,631½	3·73	247·09	273	Northfield Janet Royal	—
1 11 0	5,098½	4·81	245·23	273	Melford's Butter Lad of Pella	—
1 9 0	5,523	4·41	243·80	273	Para Wirra Comet	—
2 0 25	6,189	3·92	242·83	273	Strathearn Banker	—
2 1 22	5,409	4·49	242·72	273	Gowrie Park Leyland	—
1 8 27	4,674	5·19	242·38	273	Woodside Agatha's Gamboge	—
1 10 8	6,072	3·97	240·90	273	Gowrie Park Leyland	—
2 0 16	4,089½	5·80	237·05	273	Havec Star	—
2 1 9	4,869	4·82	234·50	273	Roseworthy Sprite	—
2 2 4	6,695½	3·49	233·34	273	Wangara Ruth's Limelight	—
1 9 9	4,741½	4·90	232·12	273	Hampden Queen's Repeater	—
1 11 24	5,320	4·31	229·52	273	Gowrie Park Leyland	—
1 9 15	5,854½	3·83	224·17	273	Elderslie Madge Gladiator	—
1 11 28	4,266	5 17	220·44	273	Roseworthy Sprite	—
1 4 6	5,058½	4 35	220·26	273	Oakbank Classical	—
2 0 21	4,641	4·59	213·25	273	Fernvale Topnotch	—
2 0 12	5,731½	3·70	212·11	273	Gowrie Park Leyland	—

PURE-BRED COWS COMPLETED

JUNIOR TWO-YEAR-OLDS —

Herd Book No	Name of Cow.	Owner and Address	Breed.	Calved
Not allotted	Lallawa Banjo Carnation	J F Dodd, Meningie	Jersey	22/9/35
"	Raglan Duchess	D Fitzgerald, Edwardstown	"	27/4/35
"	Murray Glen Sylvia Griselda 2nd	Calf Club, Glencoe	Friesian	1/4/35
"	Mira Chana Lily	H. B Peters, Mount Compass	Jersey	28/7/35
"	Hazelbrook Roma	Inspector-General of Hospitals, Northfield	Ayrshire	17/9/35
"	Hazelbrook Hester	J N Reid, Oakbank	"	26/8/35
"	Kyby Bloom	Government Farm, Kybybolite	"	16/4/35
14587	The Laurel's Prince's Star	P J. A. Braendler, Ambleside	A I S	9/8/35
28505	Gowrie Park Freda	Inspector-General of Hospitals, Northfield	Ayrshire	11/8/35
Not allotted	Lallawa Diana's Firefly	J F Dodd, Meningie	Jersey	7/8/35
13043	Northfield Florrie	Inspector-General of Hospitals, Northfield	A I.S	7/8/35
Not allotted	Willowvale Colantha Triumph	Calf Club, Compton	Friesian	3/9/35
"	Kyby Annette	Government Farm, Kybybolite	Ayrshire	28/7/35
5136	Woodside Red Rose	S W Burns, Woodside	Guernsey	9/8/35
48580	Gum Hill Silver Lass	P O Schutz, Eudunda	Jersey	26/9/35
Not allotted	Kyby Olga	Government Farm, Kybybolite	Ayrshire	6/10/35
28515	Gowrie Park Tessie	Inspector-General of Hospitals, Northfield	"	11/9/35
Not allotted	Kyby Gaybell	Government Farm, Kybybolite	"	23/1/36
"	Mira Chana Fairy	H B Peters, Mount Compass	Jersey	20/12/35
"	Kyby Resolve	Government Farm, Kybybolite	Ayrshire	6/6/35

SENIOR TWO-YEAR-OLDS

Herd Book No	Name of Cow.	Owner and Address	Breed.	Calved
44811	Lanacoona Brown May	C E Verco, Mount Compass	Jersey	30/7/35
10149	Hampden Aristocratic Lady	J A J Pfitzner, Hampden		6/4/35
Not allotted	Glen Ewin Coutance's Queen	R J Laing, Gumeracha	"	4/8/35
50952	Tuela Moss Rose	F Coleman, Saddleworth	"	11/7/35
39503	Delma Noble Lotus	E W Pfitzner, Eudunda	"	22/5/35
27231	Glen Belah Heather	E O Hancock, Andrews	Ayrshire	18/4/35
45955	Rivington Peggy	J W Crompton, Victor Harbour	Jersey	9/8/35
14260	Hampden Blonde's Crisette	J A J Pfitzner, Hampden	"	15/8/35
Not allotted	Cudlee Creek Pearl	G D Oster Balaklava	"	16/4/35
45182	Mira Chana Capture	H B Peters, Mount Compass	"	22/7/35
43580	Cumberland Countess	L W Frost, Saddleworth	"	24/7/35
45442	Ninyeri Beatrice	E L Goode, Narrung	"	17/9/35
44205	Greenoaks Cunning Lass	W A Mueller, Ambleside	"	20/8/35
12324	Long Flat Pride 2nd	Mrs A H Spackman, Long Flat	A I S	29/5/35
11989	Kiama Olive 7th	E and A Nicholls, Woodville	"	10/8/35
Not allotted	Wooroora Soeurette	A. B Sieber, Eudunda	Jersey	22/8/35
15385	Wybalenna Glow	P. J. A. Braendler, Ambleside	A I.S.	13/9/35
12776	Mt Annan Sunflower 2nd	P J A. Braendler, Ambleside		20/7/35
14586	The Laurels Poppy's Lass	P J A Braendler, Ambleside	"	6/8/35
49963	Ontario Princess Millie	T B Brooks, Clarendon	Jersey	14/8/35
12310	Long Flat Cinderella 4th	Mrs A H Spackman, Long Flat	A.I S	29/4/35
Not allotted	Hampden Sultane Jest	J A J Pfitzner, Hampden	Jersey	7/9/35
13049	Northfield Royal Blossom 3rd	Inspector-General of Hospitals, Northfield	A.I S	8/8/35
27879	West Kilbride Lassie	Inspector-General of Hospitals, Northfield	Ayrshire	11/5/35
50068	Para Wirra Maglona's Daphne	J H Dawkins, Gawler	Jersey	11/9/35
12178	Lake View Royal's Melba	J M Irwin, Mount Barker	A.I.S	26/7/35
45447	Ninyeri Princess	E L Goode, Narrung	Jersey	21/8/35
46124	Scrub View Duchess	A. B A Weckert, Brinkworth	"	19/7/35
Not allotted	Fernleigh Annette Beauty	Calf Club, Compton	Friesian	7/8/35
13045	Northfield Fortune 2nd	Inspector-General of Hospitals, Northfield	A I S	21/9/35
27329	Gowrie Park Posey	Inspector-General of Hospitals, Northfield	Ayrshire	24/5/35
13047	Northfield Lucy 2nd	Inspector-General of Hospitals, Northfield	A I.S	21/7/35
28514	Gowrie Park Sparkle	Calf Club, Glencoe East	Ayrshire	10/8/35
46032	Roseworthy Glimmer's Maid	Agricultural College, Roseworthy	Jersey	21/5/35
13044	Northfield Fortune	Inspector-General of Hospitals, Northfield	A.I S.	16/11/35
Not allotted	Kyby Snowdrift	Government Farm, Kybybolite	Ayrshire	11/11/35

JUNIOR THREE-YEAR-OLDS—

Herd Book No	Name of Cow.	Owner and Address	Breed.	Calved
41545	Pella Viola Doone	C E. Verco, Mount Compass	Jersey	8/8/35
44807	Lallawa Chieftain's Diana 2nd	Mrs. A. Bowman, Meningie	"	8/8/35
46533	Tuela Strelitzia	F. Coleman, Saddleworth	"	17/7/35
41237	Navua Grose Lassie	R J. Laing, Gumeracha	"	20/7/35
46212	Stonyfell Briar	J. W. Crompton, Victor Harbour	"	30/5/35
39499	Delma Aristocratic Lady	E. W Pfitzner, Eudunda	"	2/8/35
50956	Tuela Snowgem	F. Coleman, Saddleworth	"	18/8/35
11986	Kiama Mayflower 9th	E. & A. Nicholls, Woodville	A.I.S.	25/8/35
41236	Navua Fascination	O H. Woodward, Gilles Plains	Jersey	13/6/35
46036	Roseworthy Princess 51st	Agricultural College, Roseworthy	"	31/8/35
46214	Stonyfell Hester 4th	J. W. Crompton, Victor Harbour	"	25/5/35
46953	Alexandra Golden Princess	A. Kelly, Milang	"	22/4/35
46037	Roseworthy Princess 52nd	Agricultural College, Roseworthy	"	16/7/35
45448	Ninyeri Queen	E. L. Goode, Narrung	"	11/9/35
45145	Ninyeri Dainty Miss	E. L. Goode, Narrung	"	15/7/35
50051	Palpara Flora	Mrs. C. E. Mayger, Kapunda	"	21/8/35
26735	Strathkellar Blanche 2nd	Inspector-General of Hospitals, Northfield	Ayrshire	20/4/35
Not allotted	Kyby Snowlady	Government Farm, Kybybolite	"	26/8/35
24970	Glencourt Dinah 4th	Inspector-General of Hospitals, Northfield	"	26/7/35
11984	Kiama Honeycomb	E & A. Nicholls, Woodville	A I.S.	6/8/35
27877	West Kilbride Felicity	Inspector-General of Hospitals, Northfield	Ayrshire	23/8/35
Not allotted	Kyby Fancy	Government Farm, Kybybolite	"	17/7/35

OFFICIAL TEST—*continued*

Age at Calving.	Total Milk.	Average Test	Total Butterfat.	Days Tested	Sire.	Remarks.
Y M. D.	Lbs.	%	Lbs.			
BUTTERFAT STANDARD, 230LBS.—*continued.*						
1 9 7	3,495	6·03	210 74	240	Carrickalinga Banjo	†
1 5 17	3,964½	5 30	210 29	273	Glen Echo Kelly's Lad	—
2 2 0	6,526½	3 21	209 77	273	Murray Glen Griselda Beets	—
1 8 15	3,387	6·15	208 47	273	Mira Chana Masterlark	—
2 1 13	5,131½	4 04	207 30	273	Hazelbrook Progress	—
1 10 18	4,850	4 23	205 20	273	Hazelbrook Progress	—
2 1 3	5,166	3 89	200 77	273	Gowrie Park Leyland	—
2 1 6	5,340	3 63	193 89	273	Fairfield Prince Henry	—
2 3 17	4,306½	4 46	192 22	273	Gowrie Park Drum Major	—
2 2 3	3,075	6 06	186 22	150	Dalebank Mystifier	Withdrawn
2 3 23	5,268	3 48	183 16	273	Northfield Janet Royal	
2 4 15	5,062½	3 58	181 33	240	Glenowie Beets Posch	Dried off
2 2 2	4,065	4 36	177 29	210	Gowrie Park Leyland	Exemption
1 10 4	2,695½	6 46	174 15	273	Wollongbar Crusader	—
2 3 16	3,180	4 81	153 02	150	Pella Northwood Cavalier	Withdrawn
1 11 20	3,490	3 34	116·43	180	Gowrie Park Leyland	Dried off
2 1 12	2,460	4 30	105 88	240	Tregorland Imperator	Withdrawn
2 1 1	2,310	4 27	98 56	150	Gowrie Park Leyland	Exemption
1 7 4	2,025	4·82	97 63	150	Inglewood Lord	Dry
2 0 9	1,935	3 91	75 71	150	Gowrie Park Leyland	Dry
BUTTERFAT STANDARD, 250LBS.						
2 10 13	10,865	5 83	633 73	273	Werribee Combination	—
2 8 23	7,375½	6 13	452 42	273	Bellefaire Blonde's Aristocrat	—
2 11 4	8,719½	5 15	449 25	273	Werribee Masterman	—
2 10 1	8,130	5 30	431 29	273	Tuela Syra	—
2 10 2	7,197	5 80	417 40	273	Dalebank Noble Duke	—
2 8 2	8,766½	4 73	414 98	273	Kyby Robin	
2 10 19	7,456½	5 45	406 39	273	Baxter of Banyule	
2 7 14	6,826½	5 42	370 29	273	Bellefaire Blonde's Aristocrat	
2 9 14	5,628	6 46	363 83	273	Cudlee Creek Masterman	
2 11 16	6,531	5 29	345 69	273	Dalebank Noble Lord 6th	
2 9 16	6,287	5 41	340 40	273	Silver Lad of Eudunda	—
2 7 20	6,471½	5 25	339 86	273	Hampden Mayflower King	—
2 10 2	5,602½	5 98	335 03	273	Navua Cunning Lad	—
2 9 16	9,093½	3 68	334 33	273	Wangara Ruth's Limelight	—
2 7 0	7,966½	4 15	330 54	273	Viscount of East View	
2 6 18	5,841	5 54	323 48	273	Soeurette's Fountain Lad	—
2 10 26	7,509	4 28	321 12	273	Wangara Sunflower's Limelight	—
2 6 22	7,981½	3 81	304 14	273	Wangara Sunflower's Limelight	—
2 8 8	8,589½	3 52	301 95	273	Fairfield Prince Henry	—
2 11 9	5,337	5 65	301 50	273	Dalebank Viola's Duke	
2 8 4	8 208½	3 66	300 05	273	Long Flat Madge Gladiator	—
2 6 14	4,656	6 35	295 53	273	Woodside Agatha's Gamboge	—
2 9 23	6,946½	4 14	287 55	273	Northfield Janet Royal	—
2 10 17	6,825	4 12	281 35	273	Oakbank Classical	
2 9 1	4,611	6 09	280 94	273	Para Wirra Collegian	
2 6 26	6,780	4 09	277 34	273	Lake View Royal	—
2 8 12	5,565½	4 88	271 52	273	Ninyeri Prince	
2 6 6	4,819½	5 30	257 23	273	Scrub View Twylish Lad	—
2 10 19	6,882	3 57	245 55	273	Bonnie Doone Dutch Fancy	—
2 6 15	6,420	3 77	241 99	273	Northfield Janet Royal	—
2 10 0	5,632½	3 91	220 36	273	Gowrie Park Scottish Standard	—
2 7 12	5,845½	3 60	210 25	273	Northfield Janet's Success	—
2 8 16	4,725	4 31	203 71	210	Tregorland Imperator	Dry
2 10 2	2,937	6 38	187 46	273	Roseworthy Pretty Duke	—
2 10 17	3,960	4·06	160 77	180	Northfield Janet's Royal	Withdrawn
2 11 25	1,245	3 47	43 14	90	Gowrie Park Leyland	Dry
BUTTERFAT STANDARD, 270LBS.						
3 5 15	9,567	5 94	568 67	273	Dalebank Noble Duke	—
3 2 12	8,850	5·56	491 73	273	Chieftain 2nd of Dalebank	—
3 0 11	8,259½	5 65	466·51	273	Tuela Syra	—
3 3 1	6,771	6 86	464 72	273	Navua Grose Lad	—
3 0 10	8,512½	5 26	447·05	273	Baxter of Banyule	—
3 0 29	6·588	5 89	387 77	273	Bellefaire Blonde's Aristocrat	—
3 0 22	6,658½	5 78	384·88	273	Tuela Syra	—
3 1 2	9,246	4·06	375·71	273	Kiama Pembroke	—
3 2 16	6,255½	5 59	349·49	273	Wistaria Laddie	
3 5 17	6,231½	5 36	333 82	273	Roseworthy Pretty Duke	
3 1 13	5,841	5 61	327·40	273	Baxter of Banyule	
3 2 6	5,847	5·55	324 35	273	Hampden Queen's Repeater	—
3 4 0	5,221½	6 11	318·81	273	Roseworthy Pretty Duke	—
3 5 27	6,427½	4 93	316 91	273	Hampden Mayflower's King	—
3 2 26	5,892½	5 26	310 04	273	Hampden Mayflower's King	—
3 0 20	5,769	5·31	306·35	273	Wooroora King's Hero	—
3 1 5	7,015½	4 35	305·40	273	Gertie's Producer of Carracoorte	—
3 3 6	6,017	5 02	302 19	273	Gowrie Park Scottish Dandy	—
3 2 12	7,131	4 22	300·96	273	Belle's Best of Glencourt	—
3 2 0	7,608½	3·73	283·92	273	Pembroke of Greyleigh	—
3 0 22	5,856½	4·34	253·94	273	Oakbank Classical	—
3 4 2	5,715	3 87	221·18	210	Gowrie Park Scottish Dandy	Dry

PURE-BRED COWS COMPLETED

Herd Book No	Name of Cow.	Owner and Address	Breed.	Calved.
JUNIOR THREE-YEAR-OLDS —				
38901	Bernoota Violet	H. A. Follett, Langhorne's Creek	Jersey	3/10/35
Not allotted	Glen Lossie Duke's Pride	J. M. Irwin, Mount Barker	A.I.S.	23/8/35
11992	Kiama Pansy	Calf Club, Sutton Town	"	---/6/35
5137	Woodside Rosette	S. W. Burns, Woodside	Guernsey	10/10/35
Not allotted	Northfield Janet's Princess	Inspector-General of Hospitals, Northfield	A.I.S.	18/6/35
27880	West Kilbride Lillette	Inspector-General of Hospitals, Northfield	Ayrshire	2/9/35
Not allotted	Kyby Ida	Government Farm, Kybybolite	"	9/7/35
"	Northfield Janet's Sunflower 2nd	Inspector-General of Hospitals, Northfield	A.I.S.	24/9/35
8495	Northfield Royal Princess 3rd	Inspector-General of Hospitals, Northfield	"	30/3/35
12316	Long Flat Lucy 3rd	Mrs. A. H. Spackman, Long Flat	"	15/1/36
Not allotted	Kyby Oriel	Government Farm, Kybybolite	Ayrshire	25/11/35
"	Kyby Brenda	Government Farm, Kybybolite	"	13/11/35
SENIOR THREE-YEAR-OLDS —				
41117	Morella Princess	H. R. Walsh, Mount Barker	Jersey	22/8/35
Not allotted	Glen Ewin Misty Morn	R. J. Laing, Gumeracha	"	26/6/35
45183	Mira Chana Gem	H. B. Peters, Mount Compass	"	23/9/35
Not allotted	Murray Glen Princess Verbelle	C. J. Morris, Monteith	Friesian	27/7/35
34649	Hampden Mayfern	J. A. J. Pfitzner, Hampden	Jersey	31/3/35
Not allotted	Tuela Maple	F. Coleman, Saddleworth	"	22/6/35
"	Cumberland Molly	L. W. Frost, Saddleworth	"	15/6/35
41138	Overlook Remus Oxulla	E. W. Pfitzner, Eudunda	"	22/8/35
39737	Fernden Lady Combine	O. H. Woodward, Gilles Plains	"	3/6/35
40624	Lakeland Silvette	R. J. Laing, Gumeracha	"	16/9/35
Not allotted	Glen Belah Bertha	E. O. Hancock, Andrews	Ayrshire	5/9/35
8279	Kiama Beauty	E. A. Nicholls, Woodville	A.I.S.	27/9/35
39504	Delma Spotlight	E. W. Pfitzner, Eudunda	Jersey	21/9/35
40132	Gum Hill Queen	P. O. Schutz, Eudunda	"	18/6/35
42635	Wooroora Twinkles	A. Kelly, Milang	"	3/4/35
12171	Lake View Beauty 8th	J. M. Irwin, Mount Barker	A.I.S.	23/5/35
45564	Ontario Violet	T. B. Brooks, Clarendon	Jersey	21/9/35
34526	Pella Lotus Lily	W. P. Eckermann, Eudunda	"	16/7/35
Not allotted	Glen Ewin Morn's Mayflower	Agricultural College, Roseworthy		9/9/35
41806	Lallawa Chettam's Diana	J. F. Dodd, Meningie	"	18/6/35
8492	Northfield Prince's Charm	Inspector-General of Hospitals, Northfield	A.I.S.	8/5/35
39492	Dalkey Bonnie Lass	G. D. Oster, Balaklava	Jersey	5/8/35
41050	Mira Chana Sheila	H. B. Peters, Mount Compass	"	13/6/35
27366	Hazelbrook Lauretta	J. N. Reid, Oakbank	Ayshire	8/8/35
15303	Wybalenna Tot Again	Mrs. A. H. Spackman, Long Flat	A.I.S.	4/10/35
26521	Kyby Heroine	Govt. Farm, Kybybolite	Ayrshire	1/9/35
41499	Para Vale Fairy Queen	A. J. Marrett, Saddleworth	Jersey	30/9/35
8496	Northfield Royal Sunflower 2nd	Inspector-General of Hospitals, Northfield	A.I.S.	11/4/35
8279	Kiama Beauty	Calf Club, Sutton Town	"	5/5/35
34180	Crotton Sunny Morn	H. & A. Bohme, Balhannah	Jersey	10/9/35
Not allotted	Kyby Maggie 5th	Government Farm, Kybybolite	Ayrshire	21/10/35
"	Glenlea Fairy	E. T. Vinall, Brighton	Guernsey	17/8/35
"	Hampden Olive's Ruby	J. A. J. Pfitzner, Hampden	Jersey	26/10/35
44805	Lallawa Carnation 5th	J. F. Dodd, Meningie	"	26/9/35
39141	Crofton Souvenier	H. & A. Bohme, Balhannah	"	16/1/36
11982	Kiama Daphne	Calf Club, Sutton Town	A.I.S.	6/10/35
3340	Chandparra Cedar	R. R. Rymill, Penola	Red Poll	16/12/35
3341	Chandparra Dolly Dimples	R. R. Rymill, Penola	"	18/1/36
JUNIOR FOUR-YEAR-OLDS—				
34530	Pella Pamela	C. E. Verco, Mt. Compass	Jersey	14/7/35
35305	Austral Park Sparklett	H. R. Walsh, Mt. Barker	"	28/5/35
Not allotted	Murray Glen Flower Queen	C. J. Morris, Monteith	Friesian	29/5/35
34645	Hampden Blonde's Countess	J. A. J. Pfitzner, Hampden	Jersey	5/8/35
35311	Austral Park Swirl	H. R. Walsh, Mt. Barker	"	2/7/35
34529	Pella Mercedes Kelly	C. E. Verco, Mt. Compass	"	1/7/35
15384	Wybalenna Blossom	P. J. A. Braendler, Ambleside	A.I.S.	2/6/35
41505	Para Wirra Violet	J. H. Dawkins, Gawler	Jersey	18/8/35
39484	Cumberland Dewdrop's Lass	L. W. Frost, Saddleworth	"	6/8/35
8280	Kiama Mayflower 8th	E. & A. Nicholls, Woodville	A.I.S.	7/8/35
42025	Stonyfell Heather	J. W. Crompton, Victor Harbour	Jersey	20/6/35
34647	Hampden Just It	J. A. J. Pfitzner, Hampden	"	18/7/35
38621	Woodside Wonderful Maid	J. A. J. Pfitzner, Hampden	"	13/6/35
40133	Gum Hill Rosette's Bell	P. O. Schutz, Eudunda	"	21/7/35
34524	Pella Attraction Lotus	W. P. Eckermann, Eudunda	"	10/8/35
34528	Pella Magnet	W. A. Mueller, Ambleside	"	7/9/35
Not allotted	Roseworthy Sciential 4th	Agricultural College, Roseworthy	"	3/8/35
40131	Gum Hill Majesty	P. O. Schutz, Eudunda	"	3/9/35
38696	Ardmeen Jennifer	R. J. Laing, Gumeracha	"	9/4/35
Not allotted	Kiama Pet 2nd	E. & A. Nicholls, Woodville	A.I.S.	27/7/35
34583	Alexandra Queen Clementine	A. Kelly, Milang	Jersey	24/6/35
41498	Para Vale Cherry Starbright	A. J. Marrett, Saddleworth	"	12/8/35
15391	Wybalenna Splendour	Mrs. A. H. Spackman, Long Flat	A.I.S.	29/7/35
42711	Rosecliffe Sybils Nancy	J. A. J. Pfitzner, Hampden	Jersey	30/8/35
2980	Woodside Maisie	S. W. Burns, Woodside	Guernsey	2/9/35
Not allotted	Kyby Brilliant	Government Farm, Kybybolite	Ayrshire	8/5/35
26522	Kyby Kathleen	Government Farm, Kybybolite	"	16/9/35
Not allotted	Yatala Wanda	Inspector-General of Hospitals, Northfield	A.I.S.	29/4/35

OFFICIAL TEST—*continued.*

Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs			
BUTTERFAT STANDARD, 270LBS.—*continued.*						
3 2 23	4,710	4·69	220·73	150	Dalebank Mercedes Duke	Sold
3 2 8	5,055	4·16	210·08	240	Glen Lossie Royal Duke	Sold
3 4 0	5,955	3·45	205·33	240	Pembroke of Greyleigh	Dry
3 1 15	3,015	6·20	187·04	240	Wollongbar Crusader	Dry
3 2 8	5,004	3·68	184·35	273	Northfield Janet's Royal	—
3 3 10	3,768½	4·65	175·11	273	Oakbank Classical	—
3 0 18	4,215	3·95	166·47	240	Gowrie Park Ida's Laird	Dry
3 0 16	4,297½	3·60	154·66	273	Northfield Janet Royal	—
3 3 21	3,758	4·01	150·79	273	Northfield Janet Royal	—
3 5 1	3,825	3·84	146·92	90	Long Flat Madge Gladiator	Withdrawn
3 3 0	1,290	6·54	84·39	90	Gowrie Park Scottish Dandy	Dry
3 4 6	1,050	3·18	33·43	60	Gowrie Park Leyland	Exemption
BUTTERFAT STANDARD, 290LBS						
3 11 29	8,080½	6·53	527·83	273	Morella Anemone's Chief 5th	—
3 10 3	8,190	6·31	516·39	273	Werribee Masterman	—
3 10 5	8,163	5·74	468·86	273	Lakeland Golden Masterpiece	—
3 11 16	9,741	4·54	442·34	273	River Glen Lord Echo Griselda	—
3 11 11	5,623½	7·54	424·07	273	Bellefaire Blonde's Aristocrat	—
3 11 11	8,149½	5·18	422·51	273	Hampden Winsome King	—
3 9 25	7,257	5·67	411·34	273	Silver Lad of Eudunda	
3 9 23	7,335	5·46	400·13	273	Overlook Favorite Remus	—
3 11 27	7,414½	5·30	393·25	273	Fernden Twylish Combination	—
3 10 28	7,824	4·94	386·52	273	Tuinbungalung Airboy	—
3 11 23	9,037½	4·19	378·26	273	Gowrie Park Dairyman	—
3 11 0	9,310½	3·99	371·81	273	Viscount of East View	—
3 6 8	5,722½	6·34	362·65	273	Beauty's King of Somerville	—
3 10 22	7,035½	5·15	362·40	273	Pella Northwood Cavalier	—
3 9 28	6,355½	5·59	354·99	273	Wollingurry Cavalier's Silver King	—
3 8 20	8,872½	4·00	354·96	273	Lake View Gayboy	—
3 11 13	6,735	5·25	353·84	240	Dalebank Viola's Duke	Withdrawn
3 11 23	6,477	5·40	349·97	273	Dalebank Noble Duke	
3 11 19	5,016	6·56	329·21	273	Werribee Masterman	
3 10 29	6,075	5·34	324·40	240	Dalebank Chiettam 2nd	Withdrawn
3 6 3	7,582½	4·08	309·09	273	Northfield Limelight's Prince	—
3 9 13	5,913	5·08	300·46	273	Bellefaire Blonde's Aristocrat	—
3 8 1	4,767	6·11	291·19	273	Tuinbungalung Larkspur's Masterlark	—
3 10 18	6,436½	4·40	283·17	273	Beleura Federal	—
3 10 23	6,705	4·04	270·65	240	Wangara Sunflower's Limelight	Dry
3 11 18	6,600	3·92	259·01	210	Ida's Laird of Gowrie Park	Dry
3 6 22	5,580	4·47	249·26	210	Para Wirra Cherry Pylon	Withdrawn
3 11 2	6,028½	3·92	236·31	273	Northfield Janet Royal	—
3 6 8	6,570	3·54	232·52	240	Viscount of East View	Dry
3 6 25	4,770	4·75	226·37	120	Butter King of Pella	Exemption
3 11 6	5,445	3·92	213·36	240	Loyalty of Bridge View	Dry
3 8 1	3,417	5·95	203·24	273	Glenlea Hilda's Valour	—
3 8 1	3,615	5·40	195·19	180	Bellefaire Blonde's Aristocrat	Exemption
3 11 12	3,345	5·60	187·25	180	Dalebank Chiettam 2nd	Dry
3 8 28	2,790	5·30	147·81	120	Butter King of Pella	Sold
3 6 9	3,615	3·57	129·19	180	Liberton Freedom	Dry
3 7 3	1,545	3·87	59·76	120	Victoria John o'Gaunt	withdrawn
3 6 9	1,245	3·54	44·12	90	Victoria John o'Gaunt	Withdrawn
BUTTERFAT STANDARD, 310LBS.						
4 1 8	10,396½	5·15	535·53	273	Dalebank Noble Duke	—
4 4 8	8,653½	6·01	520·37	273	Trecarne Sheik	—
4 2 26	11,940	4·18	499·16	273	Murray Glen Netherland King	—
4 5 13	8,310	5·64	468·48	273	Bellefaire Blonde's Aristocrat	—
4 3 25	7,758	5·97	463·00	273	Trecarne Sheik	—
4 5 24	8,757½	4·92	431·28	273	Dalebank Noble Duke	—
4 1 23	10,780½	3·96	426·88	273	Wangara Sunflower's Limelight	—
4 5 20	7,368	5·68	418·69	273	Para Wirra Sunshine Twylish 2nd	—
4 2 29	7,125	5·76	410·13	273	Silver Lad of Eudunda	—
4 0 6	10,036½	4·06	407·33	273	Pembroke of Greyleigh	—
4 0 3	7,717½	5·11	394·58	273	Baxter of Banyule	—
4 2 14	6,760½	5·77	390·00	273	Bellefaire Blonde's Aristocrat	
4 1 14	6,915	5·64	389·85	273	Woodside Palatine Boy	—
4 0 27	7,374	5·28	389·36	273	Hampden Carnation's Lad	—
4 2 14	6,996½	5·54	387·86	273	Werribee Combination	—
4 5 23	7,363½	5·04	370·83	273	Werribee Combination	—
4 5 26	6,888	5·35	368·26	273	Mercedes Sweet Duke of Glen Iris	—
4 2 20	6,627	5·35	354·54	273	Hampden Carnation's Lad	—
4 4 21	6,366	5·36	341·05	273	Wooroora Starbright's Premier	—
4 3 13	8,778	3·82	335·20	273	Pembroke of Greyleigh	—
4 2 27	5,703	5·73	326·83	273	Hampden Queen's Repeater	—
4 0 2	6,625½	4·58	303·72	273	Para Wirra Cherry Pylon	—
4 3 13	8,115	3·73	302·36	240	Wangara Sunflower's Limelight	Withdrawn
4 4 3	4,576½	6·31	288·61	273	Nancy's Sybil Gambogo	—
4 0 9	4,990½	5·72	285·57	273	Wollongbar Brutus	—
4 1 3	7,039½	4·03	283·87	273	Gowrie Park Scottish Dandy	—
4 5 25	7,129½	3·94	280·74	273	Gowrie Park Scottish Dandy	—
4 5 8	7,506	3·69	277·27	273	Yatala Fleetwood	—

PURE-BRED COWS COMPLETED

Herd Book No	Name of Cow.	Owner and Address.	Breed.	Calved.
			JUNIOR FOUR-YEAR-OLDS--	
49092	Lallawa Producer's Mystery	J F. Dodd, Meningie	Jersey	12/9/35
Not allotted	Kyby Ailsa	Government Farm, Kybybolite	Ayrshire	31/8/35
34182	Sweet Haven Mercedes Viola	H A. Follett, Langhorne's Creek	Jersey	5/10/35
Not allotted	Kyby Roslin	Government Farm, Kybybolite	Ayrshire	25/8/35
38659	Alexandra Bonny Janet	A. Kelly, Milang	Jersey	3/8/35
8314	Long Flat Mermaid 2nd	Mrs. A. H. Spackman, Long Flat	A I.S.	4/10/35
			SENIOR FOUR-YEAR-OLDS--	
34510	Tuela Waratah 4th	F Coleman, Saddleworth	Jersey	15/8/35
34493	Tuela Daisy	F Coleman, Saddleworth	"	25/6/35
44801	Lakeland Satisfaction	Mrs. E M. Johns, Edwardstown	"	23/6/35
34663	Roseworthy Glimmer	Agricultural College, Roseworthy	"	5/6/35
34591	Glen Ewin Rosebud	O H Woodward, Gilles Plains	"	9/9/35
31029	Stonyfell Rosetta	J W Crompton, Victor Harbour	"	20/4/35
31027	Stonyfell Helen 7th	J W Crompton, Victor Harbour	"	28/4/35
5391	Liberton Trilby 2nd	P J A. Braendler, Ambleside	A.I.S.	22/5/35
34639	Delma Duchess	E W. Pfitzner, Eudunda	Jersey	5/9/35
34629	Brinkworth Rhodora	C. C T Ottens, Brinkworth	"	6/4/35
5422	Long Flat Cinderella	Mrs A H Spackman, Long Flat	A I.S	19/7/35
34525	Pella Golden Lotus	W. A Mueller, Ambleside	Jersey	19/8/35
Not allotted	Anama Transvaal Starlight	W. Hawker, Clare	Friesian	7/8/35
34590	Glen Ewin Coutance	Mrs. A Bowman, Meningie	Jersey	2/7/35
Not allotted	Oakhill Pimpernel 5th	Mrs. E. M. Johns, Edwardstown	"	14/4/35
5398	Lake View Melba 8th	J. M Irwin, Mount Barker	A.I S.	2/5/35
Not allotted	Hazelbrook Lorna	J N. Reid, Oakbank	Ayrshire	20/4/35
35296	Austral Park Goldora	W. A. Mueller, Ambleside	Jersey	15/9/35
Not allotted	Hazelbrook Elaine	J N. Reid, Oakbank	Ayrshire	20/8/35
5420	Northfield Royal Princess	Inspector-General of Hospitals, Northfield	A.I S.	20/4/35
34664	Roseworthy Lady 4th	Agricultural College, Roseworthy	Jersey	29/6/35
			MATURE COWS--	
5371	Kiama Robin 2nd	E & A Nicholls, Woodville	A I.S	29/6/35
34326	Melvin Duchess	C E Verco, Mount Compass	Jersey	11/8/35
2500	Murray Glen Echo Topsy	C J Morris, Monteith	Friesian	22/8/35
20738	Lupin of Tuela	E W. Pfitzner, Eudunda	Jersey	27/5/35
3646	Murray Glen Griselda Tulip	C J. Morris, Monteith	Friesian	22/4/35
3311	Anama Segis Bloom	W Hawker, Clare	"	1/9/35
31051	Cumberland Pride	L W Frost, Saddleworth	Jersey	4/7/35
34509	Tuela Swainsonia	F Coleman, Saddleworth.	"	6/9/35
31052	Cumberland Silver Lady	L W Frost, Saddleworth	"	25/6/35
2501	Murray Glen Griselda's Olda	C J. Morris, Monteith	Friesian	24/4/35
4224	Roads End Corcyra	W Hawker, Clare	"	30/8/35
29115	Belgonia Clementine	A. Kelly, Milang	Jersey	19/4/35
23700	E Rimal Surprise	E. O. Hancock, Andrews	Ayrshire	3/8/35
3652	Murray Glen Netherland Buttergirl	C. J Morris, Monteith	Friesian	1/4/35
25051	Roseworthy Erudite 2nd	Agricultural College, Roseworthy	Jersey	10/7/35
28065	Tuela Daffodil 2nd	F Coleman, Saddleworth	"	18/8/35
38614	Woodside Dreaming Satisfaction	A B Sieber, Eudunda	"	24/7/35
2499	Murray Glen Echo Sylvia	C. J. Morris, Monteith	Friesian	10/8/35
23633	Cheriton Billow	Mrs. E. M. Johns, South Plympton	Jersey	1/5/35
Not allotted	Melross Millie 11th	Dunleith Past. Co., Ashbourne	A I.S.	17/6/35
34327	Melvin Viola 2nd.	C. E. Verco, Mount Compass	Jersey	18/8/35
34508	Tuela Stephanotis	F Coleman, Saddleworth	"	2/9/35
10883	Tabbagong Belle 6th	J. M Irwin, Mount Barker	A.I.S.	3/9/35
31050	Cumberland Duchess	L. W. Frost, Saddleworth	Jersey	26/7/35
28138	Dalebank Sweetbread	W. A. Mueller, Ambelside	"	8/9/35
31122	Roseworthy Fay	Agricultural College, Roseworthy	Jersey	12/7/35
34667	Roseworthy Princess 41st	Agricultural College, Roseworthy.	"	21/8/35
28096	Pella Solanum's Sunshine	W. P. Eckermann, Eudunda	"	22/7/35
31016	Crofton Mavourneen	H. & A Bohme, Balhannah	"	9/7/35
Not allotted	Waughope Slasher 4th	Dunleith Past. Co., Ashbourne	A.I S.	12/5/35
34633	Lakeland Capture	H. B. Peters, Mount Compass	Jersey	18/9/35
34500	Tuela Gaillardia	F. Coleman, Saddleworth	"	12/10/35
24990	Brinkworth Myra	C C. T. Ottens, Brinkworth	"	26/4/35
5329	Dunleith Millie	Dunleith Past. Co., Ashbourne	A.I.S.	2/7/35
28058	Crofton Sunflower	H. & A. Bohme, Balhannah	Jersey	13/9/35
31083	Havec Tulip	Mrs. C. E. Mayger, Kapunda	"	17/5/35
20849	Roseworthy Princess 21st	Agricultural College, Roseworthy.	"	2/8/35
31132	Gum Hill May	P. O. Schutz, Eudunda	"	2/6/35
23629	Roseworthy Sunbeam	Agricultural College, Roseworthy	"	19/4/35
31155	Scrub View Cherry	A. B. A. Weckert, Brinkworth	"	24/6/35
23555	Carracoorte Viola 19th	Inspector-General of Hospitals, Northfield	Ayrshire	7/6/35
28162	Anemone 3rd of Morella	E. L Goode, Narrung	Jersey	28/6/35
31136	Wooroora Lassie	A. B. Sieber, Eudunda	"	11/8/35
23605	Hampden Rhonda	C. C. T. Ottens, Brinkworth	"	14/7/35
Not allotted	Kyby Gladys	Government Farm, Kybybolite	Ayrshire	13/9/35
"	Talmont Stella.	E. O. Hancock, Andrews	"	2/8/35
24865	Scrub View Daffodil	A. B A. Weckert, Brinkworth	Jersey	10/6/35
31104	Hampden Lady Olive	J. A. J. Pfitzner, Hampden.	"	11/8/35
31102	Hampden Juanita	J. A. J. Pfitzner, Hampden.	"	28/4/35
31093	Brinkworth Rae	C. C. T. Ottens, Brinkworth	"	1/5/35

OFFICIAL TEST—*continued.*

Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs	%	Lbs.			
BUTTERFAT STANDARD, 310LBS. *continued.*						
4 0 0	5,145	5·38	276·90	240	Producer 5th of Dalebank	Withdrawn
4 0 13	6,046½	4·35	262·90	273	Loyalty of Bridge View	—
4 2 14	4,850	5·41	262·26	150	Dalebank Mercedes Duke	Sold
4 0 15	6,330	3·77	238·89	240	Gowrie Park Scottish Dandy	Dry
4 0 5	3,990	5·42	216·13	180	Hampden Queen's Repeater	Withdrawn
4 0 19	3,915	3·80	148·60	150	Wangara Ruth's Limelight	Sold
BUTTERFAT STANDARD, 330LBS.						
4 11 21	10,256	5·32	545·90	273	Brinkworth Chris	—
4 7 16	8,192	6·03	493·67	273	Brinkworth Chris	—
4 9 19	8,053½	5·84	470·14	273	Timbungalung Larkspur's Masterlark	—
4 8 14	7,352	6·10	448·70	273	Mercedes Sweet Duke of Glen Iris	—
4 8 20	7,696½	5·66	435·63	273	Brucevale Lord Fancy Starbright	—
4 8 1	7,065	6·10	430·65	273	Mack of Glenford	—
4 9 16	7,414½	5·80	430·13	273	Mack of Glenford	—
4 7 1	9,753	4·34	422·88	273	Viscount 2nd of Eastview	—
4 11 15	8,221½	5·02	412·58	273	Beauty's King of Somerville	—
4 10 13	7,470	5·50	411·22	273	General Chris of Penrhyn	
4 8 6	10,738½	3·83	411·06	273	Ruth's Limelight of Wangara	—
4 8 0	6,669	5·94	396·26	273	Dalebank Noble Duke	—
4 9 28	9,859½	3·91	385·63	273	Longbeach Dutch Type 2nd	—
4 11 11	7,032	5·38	378·59	273	Brucevale Lord Fancy Starbright	—
4 10 8	5,847	6·22	363·44	273	Carnation's Lad of Dalebank	—
4 7 25	8,808	3·74	329·59	273	Beauty's Royal of Lake View	—
4 7 21	8,484	3·80	322·66	273	Beleura Federal	—
4 9 7	5,406	5·96	322·13	273	Austral Park Goldfinder	—
4 11 26	7,770	3·97	308·37	240	Beleura Federal	†
4 9 16	7,713	3·93	302·99	273	Janet's Royal of Northfield	—
4 11 21	5,094	5·01	255·27	273	Mercedes' Sweet Duke of Glen Iris	—
BUTTERFAT STANDARD, 350LBS.						
6 4 24	20,076	4·11	825·08	273	Viscount of East View	—
7 9 28	14,173½	5·33	755·56	273	Retford Julian	—
9 1 18	18,064½	3·68	665·22	273	River Glen Lord Echo Griselda	—
10 10 5	10,459½	5·85	611·56	273	Maid's Success of Linden	
5 8 18	13,095½	4·60	602·45	273	River Glen Lord Echo Griselda	
6 10 3	17,592	3·38	593·99	273	Inavale Lady's Pride	—
5 7 17	9,669	5·81	561·80	273	Silver Lad of Eudunda	—
5 11 24	9,681	5·76	557·89	273	Baron of Dalebank	—
5 7 21	9,711½	5·43	526·89	273	Silver Lad of Eudunda	—
9 3 1	12,783½	4·04	516·27	273	River Glen Lord Echo Griselda	—
6 4 4	16,105½	3·20	514·91	273	Rosevale King Sylvia Posch	
7 3 13	8,988½	5·58	501·49	273	Aerial of Banyule	—
6 0 15	10,944	4·51	493·30	273	Gowrie Park Dairyman	—
6 6 7	13,243½	3·72	492·11	273	Longbeach Netherland King 2nd	—
7 3 18	8,421½	5·76	485·11	273	King Solomon of Dalebank	—
8 0 21	7,374½	6·42	473·24	273	Maid's Success of Linden	—
5 3 21	8,805	5·35	471·45	273	Dreaming Bob	—
9 8 21	12,265½	3·82	468·75	273	River Glen Lord Echo Griselda	—
8 4 25	8,332½	5·61	467·85	273	Maud's Chief 2nd of Linden	—
6 11 3	10,939½	4·17	455·74	273	Melton of Melross	—
5 11 7	7,701	5·86	450·97	273	Retford Julian	—
5 0 25	8,260½	5·41	446·69	273	Hampden Winsome King	—
9 10 2	10,536½	4·23	445·83	273	Violet's Emperor of Hill View	—
6 5 7	9,452	4·71	445·60	273	Silver Lad of Eudunda	—
7 10 22	8,853	4·91	434·89	273	Mercedes Sweet Duke of Glen Iris	—
6 8 4	7,738½	5·52	427·17	273	King Solomon of Dalebank	
5 9 20	7,594½	5·54	420·99	273	Mercedes Sweet Duke of Glen Iris	—
6 5 9	8,065½	5·20	419·70	273	Melfords Butter Lad of Pella	
5 2 28	7,143	5·86	418·57	273	Butter King of Pella	—
6 2 14	10,954½	3·81	417·84	273	Garnet of Brush Grove	
5 3 25	7,939½	5·21	413·80	273	Demetreus of Tuela	
5 1 17	6,772½	6·06	410·23	273	Hampden Winsome King	
7 2 3	7,142	5·72	408·66	273	General Chris of Penrhyn	—
5 2 27	10,830	3·77	408·15	273	Merger of Melross	—
6 6 19	8,376	4·87	408·06	273	Butter King of Pella	—
6 1 3	8,278½	4·93	407·74	273	Hampden's Carnation Lad	—
9 8 8	7,399½	5·48	405·82	273	King Solomon of Dalebank	—
5 8 23	7,260	5·56	403·80	273	Hampden's Carnation Lad	—
8 8 2	8,427	4·79	403·75	273	Courtier of Dalebank	—
5 11 7	6,715½	5·98	401·36	273	Holly's King of Hampden	—
5 7 4	9,436½	4·22	398·25	273	Bluebell's Pride of Glencourt	—
6 10 21	8,308½	4·78	307·56	273	Molly 5th's Audrey Twylish of Banyule	—
	8,910	4·85	432·53	300		
5 5 29	6,915	5·69	393·56	240	Wollingurry Cavalier's Silver King	Sold
9 1 10	8,020½	4·89	392·41	273	Carnation's Lad of Dalebank	—
6 1 28	8,848½	4·40	389·46	273	Loyalty of Bridge View	—
5 9 1	8,722½	4·45	388·23	273	Beleura Captain	—
7 9 11	7,260	5·33	387·19	273	Holly's King of Hampden	—
5 10 0	7,638½	5·07	387·04	273	Mayflower's Lad of Hampden	—
5 9 29	7,969½	4·83	384·69	273	Hampden Olive's King	—
5 0 6	6,175½	6·22	384·24	273	Hampden Olive's King	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
			MATURE COWS -	BUTTERFA
Not allotted	Barton Croft Daphne	A. J. Marrett, Saddleworth	Jersey	27/8/35
24972	Cumberland Princess	L. W. Frost, Saddleworth	"	25/7/35
1199	Brush Grove Albertina 2nd	P. J. A. Braendler, Ambleside	A.I.S.	13/9/35
23622	Roseworthy Princess 26th	Agricultural College, Roseworthy	Jersey	17/5/35
32233	Penrith Fascination	O. H. Woodward, Gilles Plains	"	19/4/35
23632	Pella Lady Lotus	A. Kelly, Milang	"	8/7/35
23617	Roseworthy Dawn	Agricultural College, Roseworthy	Jersey	28/7/35
40103	Greenoaks Sweetbread	W. A. Mueller, Ambleside	"	29/4/35
18329	Kiama Pembroke's Roma	E. & A. Nicholls, Woodville	A.I.S.	11/4/35
24991	Brinkworth Ruby	C. C. T. Ottens, Brinkworth	Jersey	15/6/35
16845	Roseworthy Lady	Agricultural College, Roseworthy	"	26/4/35
7500	Tabbagong Beauty 14th	J. M. Irwin, Mount Barker	A.I.S.	2/5/35
15854	Carracoorte Blanche 4th	Inspector-General of Hospitals, Northfield	Ayrshire	30/3/35
2125	Glenlea Fi Fi 2nd	E. T. Vinall, Brighton	Guernsey	2/4/35
1543	Glenlea Dixie	E. T. Vinall, Brighton	"	11/5/35
34651	Cudlee Creek Columbine's Pearl	G. D. Oster, Balaklava	Jersey	11/8/35
28164	Belle 4th of Morella	H. R. Walsh, Mount Barker	"	23/5/35
31125	Roseworthy Princess 36th	Agricultural College, Roseworthy	"	19/8/35
12257	Laberton Betsy	J. M. Irwin, Mount Barker	A.I.S.	10/5/35
18741	Oakbank Hopeful	J. N. Reid, Oakbank	Ayrshire	18/8/35
17896	Dora of Pella	A. Kelly, Milang	Jersey	12/8/35
2344	Northfield Blossom	Inspector-General of Hospitals, Northfield	A.I.S	27/4/35
Not allotted	Sunnybrae Melvina	E. O. Hancock, Andrews	Ayrshire	3/6/35
21836	Kyby Madge 2nd	Government Farm, Kybybolite	"	22/8/35
31081	Para Vale Lucy	A. J. Marrett, Saddleworth	Jersey	6/8/35
31020	Ontario Millie	T. B. Brooks, Clarendon	"	20/9/35
31080	Para Vale Lady Starbright	A. J. Marrett, Saddleworth	"	15/9/35
28057	Crotton Bonnie Kate	H. & A. Bohme, Balhannah	"	25/8/35
28166	Morella Lilly	Mrs. D. G. Steven, Kooringa	"	19/5/35
31148	Morella Damsel 4th	Mrs. D. G. Steven, Kooringa	"	7/6/35
34547	Torrens Cleopatra	H. B. Peters, Mount Compass	"	28/4/35
31082	Para Vale Queen	Mrs. D. G. Steven, Kooringa	"	3/6/35
Not allotted	West Kilbride Lolita	Inspector-General of Hospitals, Northfield	Ayrshire	8/5/35
27319	Gowrie Park Adriane	Inspector-General of Hospitals, Northfield	"	21/6/35
2533	Glenlea Fi Fi 3rd	E. T. Vinall, Brighton	Guernsey	14/9/35
5373	Kiama Rose 2nd	E. & A. Nicholls, Woodville	A.I.S.	22/8/35
1758	Glenlea Fi Fi	E. T. Vinall, Brighton	Guernsey	4/4/35
11653	Gayboy's Sunflower of Wangara	Inspector-General of Hospitals, Northfield	A.I.S.	12/6/35
2351	Northfield Muirhead's Sunflower	Inspector-General of Hospitals, Northfield	A.I.S.	25/5/35
17880	Lucy 2nd of Toora	Inspector-General of Hospitals, Northfield	"	5/4/35
34674	Roseworthy Sunset	Agricultural College, Roseworthy	Jersey	17/5/35
25559	West Kilbride Lavender	Inspector-General of Hospitals, Northfield	Ayrshire	16/4/35
Not allotted	Hazelbrook Heath	J. N. Reid, Oakbank	"	1/8/35
21839	Kyby Rose 4th	Govt. Farm, Kybybolite	"	13/9/35
Not allotted	Fernleigh Pansy	Calf Club, Sutton Town	Friesian	13/7/35
24824	Sweet Haven Mercedes Bloom	J. M. Bray, Langhorne's Creek	Jersey	17/1/36
18420	Kyby Bluebell	Govt. Farm, Kybybolite	Ayrshire	23/7/35
23553	Dalebank Carnation 4th	J. M. Bray, Langhorne's Creek	Jersey	12/1/36
21843	Kyby Winsome	Govt. Farm, Kybybolite	Ayrshire	2/9/35
28068	Freezia 2nd of Tuela	Mrs. D. G. Steven, Kooringa	Jersey	10/8/35
31149	Morella Princella 3rd	H. R. Walsh, Mount Barker	"	4/3/36
19048	Para Wirra Ivy	D. Fitzgerald, Edwardstown	"	24/10/35

BUTTERFAT TESTS (OFFICIAL) FOR HALF-YEAR ENDED 30TH JUNE, 1936, OF PURE-BREDS
FOUNDATION AND

Particulars of Registration	Name of Cow.	Owner and Address.	Breed.	Calved.
			JUNIOR THREE-YEAR	OLD—
C.R. only	Belalie Fussy's Beauty	Calf Club, Sutton Town	A.I.S	18/9/35

COWS SUBMITTED FOR 365 DAYS OFFICIAL TEST, FIGURES FOR

Herd Book No	Name of Cow.	Owner and Address.	Breed.	Calved.
			SENIOR FOUR-YEAR	OLD—
6656	Tabbagong Dairymaid 11th	J. M. Irwin, Mount Barker	A.I.S.	3/3/35
			MATURE COWS—	BUTTERFAT
3657	Murray Glen Sylvia Topsy	C. J. Morris, Monteith	Friesian	12/8/34
22713	El Rimil Pearl	E. O. Hancock, Andrews	Ayrshire	27/2/35

N.B.—Cows marked thus † should have been submitted to a 10th test, but were not, hence their lactation periods have been

OFFICIAL TEST—*continued.*

Age at Calving. Y. M. D.	Total Milk. Lbs.	Average Test %	Total Butterfat. Lbs.	Days Tested.	Sire.	Remarks.
STANDARD, 350LBS *continued.*						
5 3 27	7,803½	1·87	380·06	273	Rockness Gold Sox	—
7 4 16	7,552½	5·01	378·19	273	King Chris of Penrhyn	—
7 4 5	10,227	3·69	377·77	273	Ardee of The Hill	—
8 5 28	6,673½	5·61	374·11	273	Courtier of Dalebank	—
5 7 27	5,577	6·70	373·69	273	Raby Result	—
8 3 25	6,238½	5·88	366·57	273	Werribee Starbright's Fancy	—
8 6 21	6,808½	5·33	362·82	273	Lad of Linden	—
5 3 10	6,765	5·32	359·85	273	Dalebank Commander 2nd	—
8 2 23	10,262½	3·46	354·59	273	Pembroke of Greyleigh	—
7 0 28	7,021½	5·01	351·90	273	Beauty's King of Somerville	—
10 11 23	8,004	4·39	351·67	273	King Solomon of Dalebank	—
5 8 29	8,208	4·20	344·61	273	Hill View Violet's Emperor 2nd	—
9 6 20	8,348	4·06	338·70	273	Mab's Pride of Gleneira	—
6 11 23	5,548½	6·10	338·22	273	Glenlea Hilda's Valour 2nd	—
8 10 2	6,198	5·49	335·16	273	Minnamurra Laddie	—
5 4 6	6,481½	5·08	329·02	273	Producer 3rd of Dalebank	—
6 10 22	6,636	4·95	328·53	273	Mercedes Sweet Duke of Glen Iris	—
6 9 14	5,686½	5·71	324·84	273	Roseworthy Twylish	—
8 8 7	8,981	3·60	323·41	273	Limit of East View	—
8 8 8	7,530	4·29	322·92	210	Aerial of Oakbank	Dry
11 3 6	6,735	4·78	322·17	240	Werribee Starbright's Fancy	Withdrawn
13 2 15	7,869	4·05	318·64	273	Somerset of Darbalara	—
5 0 16	8,590½	3·71	318·37	273	Warook Federal	—
7 1 27	7,770	4·10	318·35	240	Loyalty of Bridge View	Dry
5 6 26	6,559½	4·82	316·37	273	Dalebank Milklad 12th	—
8 2 0	5,641½	5·48	309·11	273	Molly 5th's Audrey Twylish of Banyule	—
5 10 11	5,955	5·14	305·99	240	Brucevale Lord Fancy Starbright	Withdrawn
6 2 26	5,838½	5·20	303·52	273	Butter King of Pella	—
7 2 17	5,889	5·14	302·95	273	Springmead General	—
6 3 3	6,717	4·50	302·15	273	Morella Anemone's Chief 2nd	
7 1 1	5,988	4·98	298·17	273	Dalebank Producer 3rd	—
5 9 23	5,541	5·35	296·79	273	Werribee Combination	
6 8 8	6,289½	4·63	291·32	273	West Kilbride Marquis	—
5 9 18	7,276½	3·99	290·31	273	Scottish Hero of Gowrie Park	—
5 11 18	4,339½	6·58	285·34	273	Glenlea Hilda's Valour 2nd	—
5 6 3	7,311	3·90	285·07	273	Robin Hood of Kiama	—
7 10 8	6,360½	4·44	282·19	273	Glenlea Vera's Valour 2nd	—
15 5 7	8,403½	3·32	278·72	273	Gayboy of Arrawatta	—
5 11 5	6,454½	4·31	278·03	273	Muirhead of Ben Lomond	—
7 5 24	6,684½	3·92	262·09	273	Iris 5th's Superb of Toora	—
5 4 29	4,761	5·47	260·44	273	Mercedes Sweet Duke of Glen Iris	—
5 8 12	6,691½	3·89	260·11	273	Angle Farm Progress	—
5 9 19	6,778½	3·83	259·75	273	El Rimal Count Rival	
7 4 7	6,816	3·78	257·41	273	Loyalty of Bridge View	—
5 8 6	7,365	3·20	235·90	240	Fernleigh Dutch Hero	Dry
7 7 21	4,320	4·83	208·61	150	Mercedes Sweet Duke of Glen Iris	Withdrawn
7 8 25	4,590	3·84	176·06	180	Loyalty of Bridge View	Exemption
8 11 15	3,735	4·64	173·26	120	Twylish of Dalebank	Withdrawn
7 4 25	4,185	3·83	171·87	150	Loyalty of Bridge View	Exemption
6 11 24	2,820	4·67	131·70	180	Tuela Eric	Withdrawn
6 6 18	1,725	6·35	109·59	60	Anemone's Chief of Morella	Exemption
10 8 16	1,725	5·06	87·36	90	Empire Day of Melrose	Withdrawn

WHICH ON 30TH JUNE, 1936, WERE REGISTERED, IN THE CALF ROLL ONLY AND OF APPENDIX COWS

Age at Calving. Y. M. D.	Total Milk. Lbs.	Average Test. %	Total Butterfat. Lbs.	Days Tested.	Sire.	Remarks.
BUTTERFAT STANDARD, 270LBS						
3 0 1	2,827½	3·37	95·15	150	Illawarra Miller 2nd	Dry

273 DAYS PUBLISHED IN PREVIOUS LIST FOR HALF YEAR ENDED 31ST DECEMBER, 1935.

Age at Calving. Y. M. D.	Total Milk. Lbs.	Average Test. %	Total Butterfat. Lbs.	Days Tested.	Sire.	Remarks
BUTTERFAT STANDARD, 330LBS						
4 10 13	13,370	4·17	557·09	365	Regent of Tabbagong	—
STANDARD, 350LBS.						
6 2 29	30,057½	3·29	989·05	365	River Glen Lord Echo Griselda	—
5 5 26	11,970	4·38	524·55	365	Gowrie Park Dairyman	—

closed at 240 days.

Supplement to the Journal of Agriculture, South Australia, September, 1936.]

(2) Annual Production Figures (not official) of the Hills' Herd Testing Association, 1935-36.

The Hills Herd Testing Association completed its year of operations on the 30th June, and the summary of the year's work is shown in the following statements.

It will be noted that the testing conducted under the Association rules is *not* official. The cows, in the majority of cases, are not pure-breds ; and the testing is performed by men who, though highly competent to do the work, are nevertheless not officers of the Department of Agriculture.

The identification numbers appearing in the lists are used because in many instances the Association members concerned prefer not to have their names made public.

RESULTS OF INDIVIDUAL HERDS IN THE HILLS HERD TESTING ASSOCIATION FOR THE TWELVE MONTHS ENDED 30TH JUNE, 1936.

Herd No.	Period Under Test	Mean Cows in Herd	Mean Cows in Milk	Milk Produced		Mean Butterfat Test	Butterfat Produced	
				Total	Per Cow		Total	Per Cow
	Months			Lbs.	Lbs.		Lbs.	Lbs.
7/Ddd	12	12·41	11·39	93,496½	7,520·38	4·65	4,345·49	350·06
7/P	12	29·74	25·36	199,248½	6,696·25	4·60	9,176·33	308·53
7/Eee	12	12·49	10·79	77,606½	6,218·22	4·89	3,798·64	304·17
7/Kkk	12	25·24	21·45	159,476	6,317·94	4·69	7,480·63	296·42
7/Nnn	12	16·74	13·97	116,090½	6,943·01	4·22	4,898·55	292·61
7/Tt	12	16·60	14·47	113,867	6,859·23	4·21	4,798·63	289·15
7/Mmm	12	14·64	12·86	79,850	5,451·34	5·24	4,182·64	285·70
7/Ppp	12	18·70	15·98	109,664	5,851·44	4·70	5,151·22	275·42
7/Qqq	12	21·15	17·41	118,590	5,611·84	4·73	5,609·10	265·19
7/Bbb	12	79·26	63·67	465,838½	5,880·82	4·34	20,217·05	255·05
7/Rrr	12	21·92	17·80	115,121	5,267·34	4·54	5,226·09	238·42
7/Iii	12	17·19	12·38	114,865	6,692·26	3·44	3,951·47	230·01
7/Ggg	12	16·23	13·50	77,775½	4,798·61	4·69	3,650·43	224·98
7/Ooo	12	23·83	19·14	135,792½	5,683·15	3·93	5,337·33	223·98
7/Hhh	12	13·60	10·78	78,494½	5,771·14	3·29	2,581·65	189·80
7/Vvv	11	20·45	18·46	117,365½	5,740·39	4·41	5,173·28	252·94
7/Uuu	11	22·31	19·18	101,087	4,529·18	4·23	4,277·75	191·77
7/Www	9	19·14	16·56	92,876½	4,850·45	4·14	3,849·50	201·10
7/Xxx	9	27·00	21·51	109,512	4,058·52	3·77	4,129·47	152·92
7/Ttt	12	8·06	6·98	58,494½	7,262·69	3·99	2,333·41	289·62
7/Sss	12	9·00	7·05	66,362½	7,416·56	3·97	2,632·71	292·46
7/H	12	8·84	7·20	48,373½	5,473·83	5·16	2,497·75	282·45
	256	20·64	17·10	2,649,847½	6,016·86	4·35	115,302·15	261·82

STATEMENT SHOWING PRODUCTION BY THE HILLS HERD TESTING ASSOCIATION FOR THE TWELVE MONTHS ENDED 30TH JUNE, 1936.

Month	No. of Herds	Average Cows Tested		Average Cows in Milk.		Milk Produced			Average	Butterfat Produced.		
		In Association	Per Herd.	In Association	Per Herd	By Association.	Per Herd.	Per Cow.	Test.	By Association	Per Herd	Per Cow.
1935/6												
July	18	350·97	19·50	270·39	15·02	176,907½	9,828·19	504·05	4·64	8,202·02	455·67	23·37
August	20	399·58	19·98	312·22	15·61	213,119	10,656·00	533·36	4·56	9,710·47	485·52	24·30
September	20	400·84	20·04	323·37	16·17	245,991	12,299·55	613·69	4·37	10,739·62	536·98	26·79
October	22	451·11	20·51	376·60	17·12	320,330	14,560·45	710·09	4·38	14,021·62	637·35	31·08
November	22	455·30	20·70	406·36	18·47	323,446½	14,702·11	710·40	4·32	13,983·96	635·63	30·71
December	22	455·06	20·68	408·48	18·56	274,395	12,472·50	602·99	4·24	11,635·68	528·89	25·57
January	22	453·01	20·59	400·67	18·21	213,160½	9,689·11	470·54	4·20	8,956·87	407·13	19·77
February	22	455·24	20·69	392·87	17·86	184,562½	8,389·20	405·42	4·08	7,526·53	342·11	16·53
March	22	464·36	21·11	397·13	18·05	183,583½	8,344·70	395·35	4·25	7,808·54	354·93	16·82
April	22	458·36	20·83	374·62	17·03	152,709	6,941·32	333·16	4·30	6,566·19	298·46	14·33
May	22	461·52	20·98	355·87	16·17	169,778½	7,717·20	367·87	4·38	7,431·53	337·80	16·10
June	22	479·66	21·80	357·81	16·26	191,864½	8,721·10	400·09	4·46	8,719·12	396·32	18·20
	256 21·33	5,285·01 440·42	20·64	4,376·39 346·70	17·10	2,649,847½	12,423·10	6,016·86	4·35	115,302·15	540·56	261·82

(3) Results of Gold Medal Competition for Butterfat Production, 1935-36.

Nine years ago the United Stud Dairy Cattle Breeders' Association of South Australia, inaugurated among its members a butterfat production competition, the figures for which were to be based on the results of official testing, and the computations to be made by officers of the Department of Agriculture.

A special set of rules was drawn up by the Association ; special handicaps were agreed to for the various age cows ; and certain concessions permitted in respect of cows which, owing to illness or other eventualities, would be unable to produce to the maximum of their capacity. These rules have undergone slight changes during the nine year period, and handicaps have on occasions been altered to adjust, according to the Association's opinion, the normal disparity of production between the younger and the older cows.

The Rules for the year 1935-36 were as follows :—

1. At least 6 cows per head to be entered for competition.
2. In herds of more than 6 cows, owners were permitted to withhold from competition, 25 per cent. of their number, but not more than 25 per cent. and with the proviso mentioned in Rule 1.
3. Handicaps were : –

For junior 2-year old cows	120lbs. butterfat.
For senior 2-year old cows	100 " "
For junior 3-year old cows	80 " "
For senior 3-year old cows	60 " "
For junior 4-year old cows	40 " "
For senior 4-year old cows	20 " "
For mature cows	Nil

Appended are the winners for the nine years—

1927-28	Mr. C. J. Morris, Monteith	556 58lbs. butterfat.
1928-29	Mr. J. A. J. Pfitzner, Hampden	456 81 " "
1929-30	Mr. C. J. Morris, Monteith	496 69 " "
1930-31	Mr. C. J. Morris, Monteith	465 21 " "
1931-32	Mr. C. J. Morris, Monteith	560·94 " "
1932-33	Mr. C. E. Verco, Mt. Compass	563 47 " "
1933-34	Mr. C. J. Morris, Monteith	552·48 " "
1934-35	Mr. C. E Verco, Mt. Compass	597·66 " "
1935-36	Mr. C. E. Verco, Mt. Compass	568 98 " "

Summarised results of the herds which competed in 1935.36 are appended below.

Name.	Total Cows.		Butterfat Produced.	Allowance.	Total Butterfat.	Average Per Cow.	Position.
	Competing.	Discarded					
			Lbs.	Lbs	Lbs.	Lbs.	
C. E. Verco	10	3	5,289 78	400	5,689 78	568 98	1
C. J Morris	14	4	7,237 09	600	7,837·09	559·79	2
F Coleman .	16	5	7,317 04	800	8,117 04	507 32	3
R J. Laing	8	2	3,122·32	660	3,782·32	472·79	4
E O. Hancock	8	2	3,327·42	440	3,767 42	470·93	5
E W Pfitzner	11	3	4,266 41	900	5,166·41	469 67	6
L W. Frost	9	3	3,568 08	560	4,128·08	458·68	7
H. B Peters	9	3	3,755·85	360	4,115·85	457·32	8
E & A Nicholls	15	4	6,202 54	620	6,822 54	454·84	9
J A J Pfitzner	14	4	5,237·05	1,020	6,257·05	446 93	10
J. W. Crompton	10	3	3,779 90	680	4,459 90	445 99	11
J H Dawkins	13	4	4,709·70	980	5,689 70	437 67	12
W Hawker	6	-	2,423·43	200	2,623·43	437 24	13
H Mountstephen	7	2	2,568·68	460	3,028 68	432 67	14
C. C T. Ottens	9	3	3,378 22	460	3,838 22	426 47	15
W. A Mueller	7	2	2,462 79	520	2,982·79	426 11	16
A. B Sieber	9	3	3,270 00	560	3,830 00	425 55	17
P. J. A Braendler	10	3	3,614·09	580	4,194·09	419·41	18
E L. Goode .	9	2	3,131·73	640	3,771·73	419·08	19
H R. Walsh	18	5	6,092 24	1,380	7,472 24	415 12	20
O H. Woodward	6	1	2,326 71	160	2,486 71	414·45	21
Mrs C. E. Mayger .	6	1	1,915 46	520	2,435 46	405·91	22
H. & A. Bohme .	6	2	1,973·64	460	2,433 64	405·61	23
J. M. Bray .	6	1	1,824·85	580	2,404 85	400·81	24
J M Irwin	10	3	3,492 98	480	3,972 98	397·30	25
P. O Schutz . .	9	2	3,054 24	520	3,574 24	397·14	26
A B A. Weckert . ..	6	1	1,945·53	420	2,365·53	394·25	27
Mrs A. H. Spackman	12	4	3,784·99	940	4,724·99	393·75	28
Roseworthy College . .	24	7	8,405 37	1,040	9,445 37	393 56	29
A. Kelly	10	3	3,148 14	780	3,928·14	392·81	30
A. J. Marrett	9	3	2,692·08	760	3,452 08	383·56	31
T. B. Brooks . .	6	2	1,811·94	480	2,291 94	381·99	32
J. F. Dodd . . .	11	3	2,732·56	940	3,672 56	333 87	33
J. N Reid ...	6	2	1,670 64	320	1,990 64	331·77	34
Inspector General of Hospitals	37	12	9,831·46	2,440	12,271 46	331·66	35
Kybybolite Farm .	29	9	7,345·55	2,160	9,505 55	327·78	36
E T Vinall	6	2	1,753·86	200	1,953 86	325 64	37
Mrs. D. G. Steven .	6	-	1,578·17	100	1,678 17	279 69	38
Mrs. C W. Ansell .	9	3	1,526 28	840	2,366·28	262·92	39

Frank Trigg, Government Printer, North Terrace, Adelaide.

reason it is not possible to continue growing plants on artificial manure alone is that this bacteria cannot exist on them, but must have decayed organic matter to live upon. This explains the reason why Subterranean Clover is always so much better the second year. The decayed roots of the first year help to increase the bacteria for the second year's growth.

Use the cultivator or harrows, without overstocking for the first three to five years. The first year the clover would be better not fed off until seed had ripened; this gives stock a chance to spread the seed. During the years when cultivating the soil, the land will be prepared for cropping, stock will increase the humus of the soil, and the decayed grass and clover roots will have added a valuable amount of humus.

When ploughing is necessary, this work will be easier, stumps will lift more readily and the soil sweeter because of the cultivation. Thus a crop of oats or pease will have a much better chance of being a profitable one, and land that previously was thought little of will be good grazing and worth not less than £5 per acre.

How to dispose of Surplus Cereals

[W. Bennett, Port Elliot (Inman Valley Conference).]

South Australia has always depended on its primary products for its wealth, and when things were normal it was quite all right, but now that the wheat and barley export trade has been lost because the countries who were importing the grain are now growing their own needs, in some cases have also become exporters, and are competing with South Australia.

Great Britain and the United Kingdom who used to take most of the surplus are now growing their own cereals. France now has grain to export in large quantities, and Italy has an accumulated surplus sufficient for two years' requirements. The barley export trade is also lost to Holland and Belgium, so that there is only one thing to do with the surplus grain—convert it into wool, mutton, lamb, bacon, and poultry.

During the war the call from Great Britain and her allies was for wool, meat, and wheat at a time when they found that they had only approximately 6 months' stocks on hand and, through the blockade, had little chance of getting much from overseas. At this time they took to growing potatoes as a means of producing a quick crop to prevent the population from suffering from the effects of starvation, which enlightened them to the fact that they were not self supporting but had to rely on overseas products.

There is no other country in the world that can grow stock under such natural and favourable conditions as South Australia, nor has any other country such cheap grain at its disposal. Wool stands out as a commodity in demand, and is a great asset and capable of large expansion in trade. The carrying capacity of most holdings could be almost doubled with a rationing of grain and chaff in conjunction with a mixture of wheat, barley, oats, or peas, but there must be some rough food in the shape of grass picking in the paddock, or else straw could be fed in conjunction with the cereals. Hay chaff is suggested, for not only is it a means of using some of the surplus cereals, but it also returns some of it back to the soil in the form of manure, and thus helps to enrich the land and raise the carrying capacity.

Mutton and lamb raising could very well become an important industry where large amounts of grain could be fed to stock for fattening purposes, and show a fair amount of profit for the labour and grain thus used. Wheat fed through stock will return up to 4s. 6d. per bushel, while it is only worth from 2s. to 2s. 3d. to the grower at the time. Barley is a most useful food for fattening sheep and lambs; it is cheap, and they will consume large quantities of it once they become used to it. Given in conjunction with oats or peas, it has no equal, nor will anything else produce higher quality mutton or lamb, more particularly lamb. Pigs are able to convert large amounts of grain into profit quicker than any of the above-mentioned stock, and in South Australia are all able to live in the paddock all the year round, which is a distinct advantage over other countries.

South Australia is particularly adapted for the production of bacon; first there is the advantage of being able to use the cheapest grain of any bacon raisers in the whole world; secondly, the stock can be reared in the open paddock under normal conditions—again more cheaply than any other country—and the pigs only need shutting up for three or four weeks to top up for market; thirdly, the market is practically unlimited; and fourthly, South Australia is not suited to the production of pork as the market is decidedly limited for that product. New Zealand specialises in the production of pork, and is able to produce it cheaper than South Australia because they have waste by-products from dairies, and can more than supply the demand from overseas.

Poultry and Eggs.

This is capable of unlimited production, and like bacon is a means of disposing of large quantities of grain at considerable profit, and in doing so employs more people on the land. In addition to eggs going overseas, dressed poultry could be frozen or canned and exported.

New Zealand imports Australian wheat to feed to pigs or produce pork, and it costs them 4s. per bushel, plus landing and distribution charges; if they can do that, why is not South Australia in a position to grow bacon with the cereals already distributed in the country? Queensland takes very large quantities of South Australian barley to turn into bacon to export overseas, and in so doing competes with us. The United States of America were once big wheat exporters—in fact, they more or less controlled the markets of the world—now, however, they are importing wheat, and for the nine months ending last April imported from Canada 15,000,000bush.—an increase of almost 2,000,000bush. on the year previous—the bulk of which was for feeding to livestock to turn into meat for export.

Combined with feeding and stock raising is breeding—breeding the right type for the particular needs of the market in view. This is one of the most important factors in securing a market, and applies to bacon as well as mutton, lamb, and beef just as much as the breed tells in a milking cow. Bound up with the above are methods of transport and marketing. No stock should be travelled long distances as at present, this being a matter which needs drastic changes and re-organisation. Transport and handling methods must be altered if South Australia is to take a stand in the world's markets and hold its place against all comers.

The first changes to be made should be that all stock should be slaughtered in the district where it is grown and put into cool-chambered trucks to shipping ports in the cool overnight, instead of sending it over long distances which causes bruising of the carcass. There should be export depots and freezers at Wallaroo, Port Pirie, and Port Augusta. If the killing was done in the district where the meat was grown there would only be from 32lbs. to 34lbs. of meat sent on, as against the present system of sending the whole carcass weighing probably 68lbs. to 70lbs.

In the South-East there are practically unlimited resources for stock raising. Under present conditions the cream of the stock is sent to Victoria. This could be diverted to the South Australian trade if there was an up-to-date freezing works at Kingston. In the present circumstances Victoria has the freezing works decentralised, with such works and up-to-date facilities at Portland, connected with the heart of the South-East by rail; also at Mutooa, which is connected with Pinnaroo and Lameroo by rail, and in consequence buyers are able to go to farms, purchase South Australian lambs, and give from 1s. 6d. to 2s. a head more than Adelaide buyers can do, which is a direct loss to

South Australia. In addition to lambs they collect thousands of carcasses of rabbits as well as ewe and wether mutton for canning purposes, to say nothing of the £10,000 of hard cash that they pay to the dairying industry every Friday fortnight within a radius of a few miles of Mount Gambier. There are some 20-odd cheese factories in this district, where all milk is supplied to factories within an hour's time of being milked from the cow. All that trade could be retained by South Australia with proper facilities at Kingston, and thus assist in the advancement of South Australia instead of trade going over the border.

Does Feeding Pay?

[W. F. ROADS, Inman Valley (Inman Valley Conference).]

Always a controversial subject among dairymen is the value of handfeeding of dairy cows during a lean time or a late season. Most farmers in the Hills districts have rapidly to handfeed the stock or to seem them lose condition. What is the use of buying bulls of high-production strains and breeding a herd of cows to produce heavily year after year and then deny them an opportunity to live up to their breeding? To make dairying what it should be cows should be kept up to their full capacity for at least nine months of the year. Note the high-producing cows under Government test, and see a good average production right through to the last month. This can be summed up in one word—"feed."

Clover or meadow hay, although a good all-round feed, has not the feeding qualities some people are led to believe. In the south districts dairymen like the cows to calve in autumn; they milk all right for a time and then ease off somewhat although plenty of meadow hay may be available. The remedy for this state of affairs is good oaten chaff and bran, and a little linseed—something that will keep them in good heart until the pastures are in a flourishing condition.

The farmer who has cereal hay will get good returns for it through cows. Another bugbear—cows failing to get in calf—would be considerably reduced if top-dressed pastures were balanced with cereal chaff in the rations. This alone is a big item. A cow that is worth her place in the herd if fed up to requirements will produce at least 30 per cent. more than one just on a maintenance ration. Another point: cows doing well one year will fail to come up to expectations the next year. Nine times out of 10 this can be put down to inadequate feeding on the previous milking.

Neither should one lose sight of the fact that skim milk properly handled will put another 1½d. per lb. on butterfat in the form of bacon—the more milk the more pigs can be handled. Two of the most successful dairymen in the district feed bran and chaff all the year round, and average £19 per cow for butterfat alone. Over a number of years handling good cows in all kinds of seasons, I am strongly of the opinion that the road to success in the management of dairy stock is first to breed and then to feed. Money spent for fodder on good producing cows is "good business."

Hens Eating Eggs.

Mr. M. W. Aird (Assistant Poultry Expert) has advised the Secretary of the Cambrai Branch of the Agricultural Bureau that the vice of egg eating is difficult to eradicate, and if the real culprit can be caught in the act of deliberately breaking and eating an egg, it is always wise to dispose of her. On the other hand, the trouble can often be checked by cutting a small piece off the points of the beaks of all the birds; this makes the beaks very tender and much more difficult for them to break an egg.

Statistical Returns

By A. W. Bowden, Acting Government Statist.

Eggs in Shell and Egg Pulp Exports.

From returns specially collected from Exporting Merchants.

The grand total exports for each of the years 1931-32 to 1935-36 were respectively £236,095; £342,915; £358,056; £360,540; and £325,892. For the last year, 1935-36, exports showed a decrease of £34,648 as compared with the previous year, 1934-35.

The grand total exports of eggs in shell and in pulp in terms of eggs in shell is estimated to have been 5,200,000doz. for 1931-32; 7,300,000doz. for 1932-33; 7,900,000doz. for 1933-34; 8,000,000doz. for 1934-35; and 7,500,000doz. for 1935-36.

Compared with the previous year, there was a decreased export of 973,268doz. eggs in shell to overseas countries, but an increase of 59,263doz. to the other States. There were increases of 183,948lbs. of egg pulp exported to oversea countries and 289,286lbs. to the other States. Practically the whole of the eggs in shell and in pulp to oversea countries is shipped to the United Kingdom, while New South Wales and Victoria are the heaviest buyers amongst the States of the Commonwealth.

The following are the details for 1935-36 and 1934-35:—

State.	Eggs in Shell.		Egg Pulp.		Total Value.
	Doz.	£	Lbs.	£	£
New South Wales (Ex. B.H.)	618,078	24,371	1,764,397	52,371	76,742
Broken Hill	318,694	13,609	20,354	614	14,223
Victoria	239,249	9,900	812,534	25,003	34,903
Western Australia	286,342	16,033	215,988	6,326	22,359
Other States	18,700	996	133,500	4,278	5,274
Total Interstate—1935-36	1,481,063	64,909	2,946,773	88,592	153,501
1934-35	1,421,800	59,834	2,657,487	83,947	143,781
Oversea (Direct)—1935-36	3,456,050	165,892	266,948	6,499	172,391
1934-35	4,429,318	214,141	83,000	2,618	216,759
Grand Total—1935-36	4,937,113	230,801	3,213,721	95,091	325,892
1934-35	5,851,118	273,975	2,740,487	86,565	360,540
Increase or Decrease	—914,005	—43,174	473,234	8,526	—34,648

Livestock Statistics, Year 1935.

I. Sheep and Wool.

1. *Number of Sheep.*—The sheep flocks on 31st December, 1935, numbered 7,945,745 (7,884,919), being 4,685 more than the record of 7,941,060 in 1933. The flocks were classified as follows:—Ewes, 4,222,452 (4,199,530); wethers, 2,009,789 (2,091,575); rams, 109,469 (104,437). Under one year old, 1,604,035 (1,489,377).

2. *Breeds of sheep* were reported by owners as follows:—Merino, 6,748,739; Corriedale, 92,621; Dorset Horn, 7,654; Leicester (Border), 6,103; Polwarth, 2,724; Shropshire, 2,723; Suffolk, 2,551; Southdown, 2,303; Romney Marsh, 2,102; Leicester (English), 1,111; Ryeland, 1,024; Lincoln, 736; Hampshire Down, 152; Pure Breds (not specified), 6,969; Merino Comeback, 521,186; all other (including crossbred), 547,047; total, 7,945,745.

3. *Lambing,* 1935.—During the year 1935 3,408,758 (3,408,561) ewes were mated and 2,049,514 (1,875,296) lambs marked; percentage, 60.12 (55.02).

4. *Winter Lambing,* 1936.—3,559,487 ewes were reported as either mated or intended to be mated for the winter lambing of 1936. In addition, 146,976 ewes were expected to be reserved for spring lambing. Details for the 1936 winter lambing

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BULLETINS.

Bulletins may be obtained by sending 1d. each to cover postage.

Agriculture—

	No.
Malting Barley (A. G. Barrett)	271
Efficient Wheat-growing methods (R. L. Griffiths)	265
Fallowing and Cultivation methods for Sandy Soils (R. L. Griffiths)...........	236
A Classification of S.A. Wheat Varieties (H. C. Gurney, Waite Institute)	266
Capital Invested in Farming (Prof. A. J. Perkins)	239
Financial Results of Two Years' Farming on Murray Mallee Farm No. 1. (Prof. A. J. Perkins)	269
Present and Future Economic Position of Farmers (Prof. A. J. Perkins)	250
Turretfield Demonstration Farm, Tenth Report (Prof. A. J. Perkins)	277
World Position of Wheat (Prof. A. J. Perkins)	241
Experiments with Manganese Deficiency of Barley (R. C. Scott)	258
Wheat Varieties (R. C. Scott)	272
Fertilisers and Soil Amendments (W. J. Spafford)	278
Harvest Damage to Barley	259
Weevil in Wheat and Storage of Grain in Bags	—
Mallee Farm Costing (Prof. A. J. Perkins).	293
Reflexions on Wheat Growing (Prof. A. J. Perkins)	298
Carbonate of Lime Experiments (R C. Scott)..	—
Our Wheatgrowing Areas (Prof. A. J. Perkins)	312

Sheep and Fat Lambs—

	No.
Improving the Farm Flock (W. J. Spafford)	231
Selection of Rams for Farm Flocks (W. J. Spafford)	222
Production of Fat Lambs (R. C. Scott)....	251
Fat Lamb Production Investigation (W. J. Colebatch and R. C. Scott)...........	211
Turretfield Automatic Sheep-feeder (F. E. Waddy)	213
Farm Sheep and Wool (C. A. Goddard)...	306
Rugging Sheep (R. C. Scott)	309

Pastures and Fodders—

	No.
Increasing Stock-carrying Capacity of Mallee Farms (R. L. Griffiths)	302
Lucerne Cultivation (W. J. Spafford)	246
Subterranean Clover (W. J. Spafford)	240
Silage, Use and Making (W. J. Spafford) .	274
Lucerne Flea in S.A. (Dr. J. Davidson)....	286
Top Dressing Poor South-Eastern Pasture Land (Prof. A. J. Perkins)	224
Seeding Permanent Pastures (W. J. Spafford)	261
Effect of Top Dressing on Natural Pasture (H. C. Trumble and K. Fraser)	268
Pasture Improvement (Scott and Hutton)	307

Livestock Feeding—

	No.
Livestock Feeding Experiments (W. R. Birks)	252
Equivalence of Livestock Foodstuffs (Prof. A. J Perkins)	102

Dairying—

	No.
Feeding for Production (R. Baker)	257
Mammitis, Milk Fever and Contagious Abortion (A. H. Robin)	273
Care of Milk and Cream on the Farm (W. N. Rule).........................	288
Amended Conditions for Herd Testing Associations	199
Official Stud Cattle Testing	177
Calf Rearing (H. J. Apps)	282

Pig Raising—

	No.
Pig Feeding and Bacon Breeds (W. R. Birks and R. Baker)	245
Future of Pig Raising (W. J. Spafford·	283
Raising Export Pigs with Barley (W. J. Spafford)	—

Poultry—

	No.
Egg-laying Competition Report, (C. F. Anderson) ..1933, 281 ; 1934, 295 ; 1935,	305
Generalities Concerning Farm Poultry (C. F. Anderson)....................	297
Packing and Handling Eggs for Transport (C. F. Anderson)......................	291
"Watery White" in Eggs (C. F. Anderson)	308

Horticulture—

	No.
Frost Prevention by Orchard Heating (J. B. Harris)	292
Fruit Drying for Beginners (G. Quinn) ..	198
An Orange Survey of S.A. (F. R. Arndt)..	287
Steaming of Figs (N. S. Fotheringham) ..	284
Vine Pruning in Non-Irrigated Districts (J. L. Williams)	264
The Almond in S.A. (G. Quinn)..........	220
The Codlin Moth (G. Quinn)	XIV
Influence of Season on Rooting of Vine Cuttings (G. Quinn)	253
Production of Early Outdoor Tomatoes (G. Quinn)	196
Remedies for Diseases of Fruit Trees and Vines (G. Quinn)	256
Selected List of Fruit Trees, etc. (G. Quinn)	91
Surface Blemishes of Oranges (Dr. J. Davidson)	270
Fruit Drying (G. Quinn)	198
Irrigation and Drainage (F. R. Arndt) ..	303

Domestic—

	No.
Dressmaking and Fancy Stitchery (Miss E. Campbell)	263
Uses of Wool and Sheepskins on the Farm (Miss E. Campbell)..................	290

Miscellaneous—

	No.
Agriculture of the Southern Hemisphere (W. J. Spafford)	310
Notes on Building Construction (T. A. McAdam)	301
The Claim of Men on the Land (Prof. A. J. Perkins)	300
Land Settlement Activities of the Employment Promotion Council (W. J. Spafford)	296
Farm Gates (R. L. Griffiths)	280
Cement Concrete Fencing Posts (W. J. Spafford)	225
Tobacco Culture (R. C. Scott and S. B. Opie)	248
Tobacco Culture (Commonwealth Tobacco Committee)	—
Agricultural Bureau, Handbook for Secretaries	230
Berri Experimental Orchard, Second Report	147
Reclamation of Salt Patch, Berri Experimental Orchard (Prof. A. J. Perkins) ..	174
Records of Some Departmental Work, 1927-28 to 1934-35 .... 238, 247, 279, 294, 304,	262 311
Roseworthy Agricultural College Harvest Reports, 1916-17, 114 ; 1918-19, 123 ; 1919-20, 136 ; 1922-23 to 1927-28 Nos. 171, 183, 192, 200, 206,	223
Experimental Farm Harvest Reports, 1919-20, 158 ; 1920-21, 157 ; 1921-22,	165
Herd Testing Report, 1923-24, 188 ; 1924-25,	194
A Plea for Nation Wide Research (Prof. A. J. Perkins)........................	212
When is Water Safe for Irrigation Purposes ? (Prof. A. J. Perkins)	176

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are being obtained and will be published later.

5. *Wool Clip.*—8,091,682 (8,131,202) sheep and lambs were shorn, the total clip, including locks, bellies, pieces, &c., being 70,912,985 (68,547,294) lbs.; increase, 2,365,691lbs., which is the highest clip on record. The average fleece for sheep and lambs combined was 8.76 (8.43) and for sheep only, 10.40 (9.66) lbs.

6. *Total Wool Production.*—Subject to slight revision, it is estimated that the grand total wool production, including the clip and wool fellmongered and wool on local skins exported, was a record, being 81,000,000 (77,790,933) lbs.; increase, 3,209,067lbs.; value £4,023,000 (£2,654,616); increase, £1,368,384; the average value per lb. greasy being 11.92d (8.19d.).

II. CATTLE.

1. *Numbers.*—All kinds, 335,354 (346,479); decrease, 11,125; dairying cattle, 173,706 (170,250); increase, 3,456; classified as follows—in milk, 117,961 (113,811); dry, 40,275 (40,198); and heifers springing, 15,470 (16,241). In addition, there were 20,030 (22,878) other heifers one year and over which are possible additions to the dairying herds. The dairy cattle number exceeded the record of the previous year.

2. *Butter and Cheese.*—Provisional 1935-36 butter, 20,500,000 (18,513,229) lbs.; and cheese, 8,060,000 (6,649,661) lbs Oversea exports were:—Butter, 7,953,012 (6,299,175) lbs.; cheese, 3,898,651 (2,359,107) lbs. Cheese production exceeded the previous record by approximately 1,400,000lbs. and the oversea exports by nearly 1,540,000lbs. Butter production exceeded the previous record by approximately 750,000 lbs.

III. HORSES.—197,368 (198,765); decrease, 1,397.

IV. PIGS.—93,458 (86,297); increase, 7,161.

V. GOYDER'S LINE OF RAINFALL AND LIVESTOCK.

During the year 1935 the percentage to the total sheep outside Goyder's line of rainfall decreased from 32.65 to 28.17; cattle, 27.63 to 26.51; and horses, 26.95 to 26.77. The numbers within and without the line for 1935 were:—Sheep, 5,707,431 and 2,238,314; cattle, 246,440 and 88,914; horses, 144,528 and 52,840.

VI. INTERSTATE MOVEMENT OF STOCK.

The State gained 31,309 head of cattle, 60,658 sheep and 638 horses by transit of stock between States. The total interstate imports were:—Sheep, 173,507; cattle, 36,959; horses, 1,928; and exports:—Sheep, 112,849; cattle, 5,650; horses, 1,290; net export of horses to oversea countries, 250.

VII. SLAUGHTERING.

Sheep and lambs, 1,642,550 (1,591,054); cattle, 153,686 (140,170); pigs, 153,858 (150,575). Oversea exports, 1935-36, were:—342,177 (273,680) carcasses of lamb; 636 (3,493) carcasses of mutton; 1,730,598 (1,035,066) lbs. of pork; 956,788 (473,666) lbs. of beef; and 106,231 (93,179) lbs. of veal.

VIII. VALUE OF PASTORAL AND DAIRYING INDUSTRIES.

Provisional for 1935-36, £7,130,000 (£5,398,179); increase, £1,731,821.

To Make a Grindstone.

Mr. R. Guthrie of the McLaren Flat Branch supplies the following information:—Take 5 parts of good clean, washed sand to 1 part of cement. Mix well and place in a mould of the required size, placing the spindle in the centre. Leave to set for several days before taking out of the mould.

Frost Prevention

In company with Messrs. B. Boehm (Light's Pass), S. H. Maddern (Berri), R. Francis (Waikerie), and E. L. Hodge, as co-delegates from South Australia, Mr. J. B. Harris (District Horticultural Instructor) reports that on 10th August he attended a meeting held at Mildura under the auspices of the Australian Dried Fruits Association to discuss frost prevention. The following recommendations were drawn up by a sub-committee.

The Principle of Direct Heating.

The use of direct heating is essential and will save fruit crops. The principle of the method can be set out as follows:—

The heat generated by the burners does not escape into the upper reaches of the atmosphere, nor is it intended to any appreciable extent to warm the plant by radiant heat—but will only rise to the height where it meets air of a corresponding temperature (the ceiling), which in average spring conditions would be from 10ft. to 25ft. up, after which the heated air, being unable to escape to higher levels, gradually fills up the space between the "ceiling" and the ground.

As the air surrounding the plants is warmed, cold air will move in from adjacent areas and the further function of the heating is to warm up this air as it comes in. The practice of banking additional heaters on the sides where the main drift comes in is brought about for this reason.

Under actual dangerous conditions, there is need only to develop sufficient heat, either by the number of burners or by retarding the burning rate of the burners, with the use of dampers, that will keep the temperature at a safe point. There is nothing to be gained by unduly raising temperature with the consequent loss of fuel that might be needed later in the night.

The Temperature at which to Light Heaters to ensure Protection.

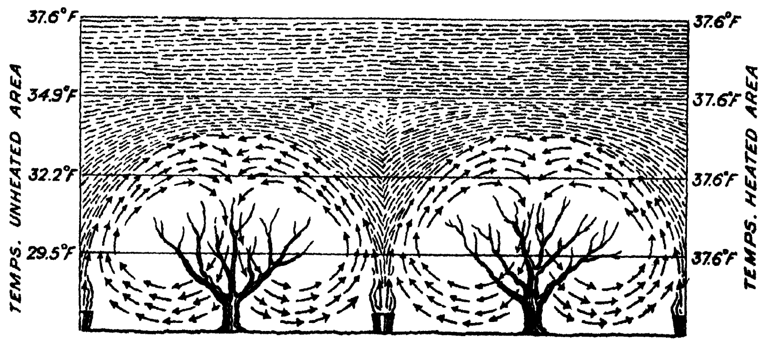
The results of experience to date are such that it can be stated that the following temperatures, under which delay in lighting would involve risk, are critical.

Sultanas.—Readings taken on a sheltered thermometer (see notes on this) 3ft. from the ground, or equivalent to the height of the middle wire.

Bush Vines.—Readings taken at a height equal to susceptible shoots. Critical temperature 32 degrees Fah.

Apricots.—Readings 3ft. from the ground. Critical period—at full bloom, 31 degrees; at setting period, 32 degrees.

For other fruits no definite results were available from actual tests described to the Conference. However, tables are available from the bulletin "Frost Risks and Frost Forecasting," by W. S. Watt, Commonwealth Meteorologist.



The path of the heated air currents.

Probably Safe Low Temperature Limits for Different Trees.

Kind of Fruit.	Buds Showing Colour.	In Full Bloom.	Fruit Setting.
Apples	27	29	30
Apricots	30	31	32
Almonds	28	30	31
Blackberries	28	28	28
Cherries	25	28	30
Grapes	31	32	32
Oranges	30	30	—
Lemons	—	32	30
Pears	28	29	30
Peaches	25	28	30
Plums	30	31	31
Prunes	30	31	31
Raspberries	28	28	28
Strawberries	28	28	28

Fuels and Heaters Suitable for Certain Conditions.

Spring Conditions.—In view of the capricious nature of the spring frosts, when the temperature might rise rapidly after getting down to danger point, it is considered that the fact of being able to put out the oil fire without loss or trouble and again light if necessary, is a factor that makes the oil heater much more suitable for these conditions. Instances have occurred where settlers have put out fires due to a rise in temperature, only to be faced with the necessity to light again due to an unexpected fall later. Under such conditions it would be a very difficult problem with briquettes. The briquettes have to be tipped out, and the oil simply extinguished by use of the burner lid to prevent further burning.

Recent trials indicate that the rise in temperature and the rate of such rise favours oil.

Number of Heaters to the Acre.

Evidence shows that the number of heaters per acre varies in trials to date from 20 to 120 where oil is used, and from 50 to 60 with briquettes—a partial save on young shoots being claimed with 20 and a rise of 17 degrees definitely being obtained with 120. In view of recent experiments and information from other sources approximately 60 oil heaters to the acre are recommended as being the number necessary to control the type of frost generally experienced in the main growing areas for vines and deciduous trees. Where isolated portions are subject to extra severe visitations more might be needed, and for light frosts fewer would suffice. However, with 60 oil heaters it should be possible, by lighting a certain number, to control an average frost, and by careful consideration of readings to hold the temperature, with the advantage of having the power to lift the temperature further by lighting the balance in the event of an increase in the severity of the frost causing a fall near to danger in the heated area. This is a matter in which the co-operation of all growers and those handling heating plant is essential, for, as stated above, the true test can only be obtained under local conditions during the danger period when results would be very definite on the plants subject to damage.

(NOTE.—The heaters referred to above are the five-quart type that hold one gallon without danger of loss. The general principle in the use of heaters is that better effect is obtained with a certain number of small fires than with a smaller number of large ones.)

Thermometers.

A good deal of confusion can result if the method of reading and using the thermometers is wrong. A good type instrument is essential.

A Negretti and Zambra minimum thermometer, as used by the Commonwealth Weather Bureau, is recommended as being the best for use as a main check on all others on the area being heated. Good mercury thermometers can be used for ordinary observations. All thermometers should be placed in a shelter facing the south and at a height equal to the lowest level of the crop to be protected.

Ground readings are erroneous: an instance of this being shown by tests taken by Mr. West, of Griffith Research Station, where it was found that thermometers, placed as follows, read:—Grass 14.6 degrees, cultivated ground 18.5 degrees, uncultivated ground 20.6 degrees.

Alarm Thermometers.

Recent findings would indicate that there are certain weaknesses in the "U" type of this instrument. Failures have resulted, and advice from America bears this out. Growers are advised to read a publication by Mr. Harris, of the Department of Agriculture, South Australia, "Bulletin 292: Frost Prevention by Orchard Heating" (pages 11 and 12), which deals with this matter. Information on this aspect is available from Mr. Harris.

Care must be taken to avoid the effect of a naked light on the column when reading thermometers. An electric torch is advised.

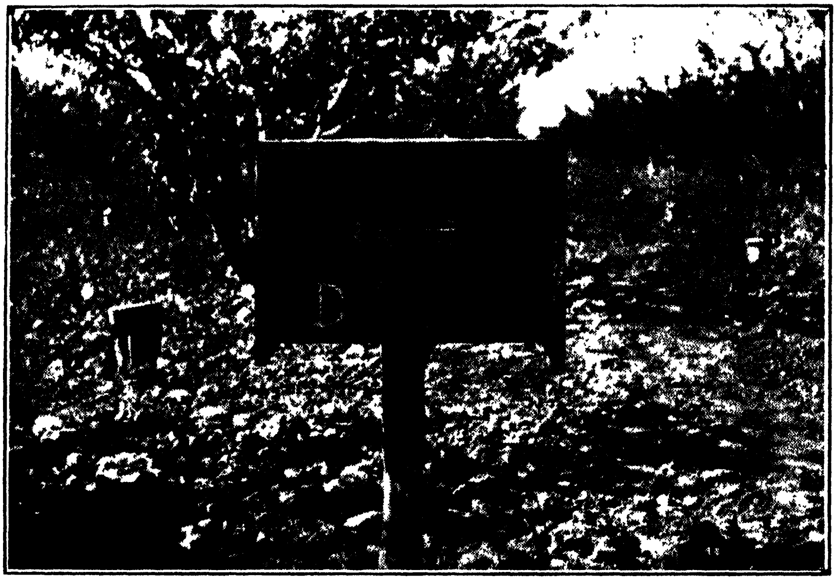
Notes on Wooden Shelters.

Two pieces of rough timber 18in; by 9in. and 1in. thick, painted a flat white and joined to form an "L," then attached to a red gum post, the bulb of the thermometer to be 1½in. from the vertical board and 2½in. under the horizontal board and within 4½in. of the ends of the boards. Thermometers to be open to the south.

Subsidiary Agencies.

(*a*) The concensus of opinion was that standing cover crops accentuated the severity of frosts, and they should be turned down before the local frost period occurs. (*b*) The accepted opinion was that cultivation should be avoided as much as possible during the danger period. (*c*) The nearer irrigation water can be applied to the frost period, then the greater degree of safety. (*d*) The destruction of timber fringes round frost affected areas assists in controlling frost. (*e*) Very late pruning, about 10 days before sprouting, retards sprouting. This may be of value in sections particularly liable to frosts.

Note on (*b*).—It is also advisable to avoid the working of land where damage to roots would take place a week or two before the frost period. The general practice should be to cease this work about a fortnight before bud burst on vines and not do any further work until about 15th October. If irrigation is available just previous to bud burst, work could be carried out a little closer to the danger period.



Thermometer in a shelter. Heaters are in position in the Orchard.

Note on (*c*).—Irrigation at the proper time (first week in September) is a big advantage, in that it gives the vine a rapid flow of sap greatly assisting it to withstand the cold. The vital tonic effect of the fertilisers applied to the soil is made more readily available to the plant and stronger shoots are formed. Wet ground will not give off its warmth so quickly. All water authorities should be seized with the importance of this feature of protection.

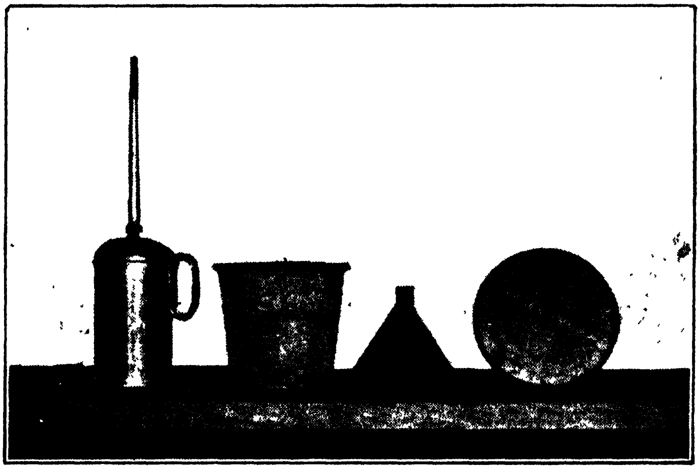
Note on (*d*).—Recent tests indicate that timber should be cleared at least half a mile around the areas subject to damage. Differences in temperature up to 6 degrees have been found between mallee belts and cleared land, on the same level, half a mile away.

Frost Forecasting.

Arrangements are being made to have more detailed warnings sent out to growers. Details of this will be notified in the newspapers in the areas concerned.

Organisation of Alarms.

The use of the alarm thermometer in groups is advised. In certain areas growers have an arrangement whereby one alarm thermometer is used to warn a number, and an arrangement is also made with the local post office to ring certain men, who, in turn, warn others. By this arrangement a good deal of concern is avoided.



Lighting torch, burning pail, flame spreader, and lid.

Feeding Smutty Barley to Stock.

Replying to the Secretary of the Green Patch Branch of the Agricultural Bureau who asked, "Is it safe to crush and feed to stock barley containing a fair amount of smut, or should it be soaked,", Mr. W. J. Spafford (Director of Agriculture) says, there is always a danger in feeding farm animals with any grain containing much smut, and the risk is greater with horses than with other animals, and because of this the "bunt" balls should be floated off the grain before giving it to animals. Practically all "bunt" balls will be removed if a small stream of affected grain is run into water, and the "bunt" can be skimmed off the top of the water. As soon as the water has been skimmed, the bulk of it should be drained from the grain, because when soaking grain, only the amount of water which will be absorbed by the grain should be used.

Agricultural Bureau of South Australia

Conference of Southern Branches

Mr. A. M. Fuller (President), and the members of the Inman Valley Branch are to be congratulated on having organised and brought to such a successful issue the first district Conference held under their auspices. A particularly good attendance of delegates from neighbouring Branches, together with excellent papers and discussions, all combined to make the Conference an outstanding success.

Delegates at the Southern Conference at Inman Valley.

Conference was opened by Mr. A. J. Cooke (Member of the Advisory Board of Agriculture), and the following papers were contributed:—"How to Dispose of Surplus Cereals"—Mr. W. Bennett (Port Elliot); "Does Hand-feeding Pay?"—Mr. W. F. Roads (Inman Valley); "Reasons for Clearing Scrub Blocks"—Mr. F. C. Keen (Port Elliot); and "Development in the Southern Districts"—Mr. R. Hill (District Agricultural Instructor).

In recognition of 20 years' active association with the Agricultural Bureau, Mr. Cooke presented Life Membership Certificates to Messrs J. W. Crompton, A. M. Fuller, H. J. Jagger, F. C. Keen, and H. M. Parsons.

Items of a veterinary nature occupied the major portion of the agenda; questions submitted by Branches were replied to by Mr. C. McKenna, B.V.Sc., of the Stock and Brands Department.

The following resolutions were carried:—"That the 1937 Conference be held at Finniss"; "That the Government increase the vote for Agriculture"; "That a veterinary officer be made available for lectures to Branches of the Agricultural Bureau"; "That the Government take active steps to prevent the spread of noxious weeds, especially Cape Tulip"; "That the bounty on superphosphate be continued"; "That the Government be asked to protect kangaroos and opossums all the year round in the areas extending from Adelaide to the South Coast"; "That the compulsory subscription to the *Journal of Agriculture* be removed"; "That a motion be forwarded to the district council of Yankalilla advising them that the patches of noxious weeds now being dug up in the course of road construction be not transported in the form of 'filling' to other portions of the district."

Conference at Gumeracha

Delegates from Blackwood, Carey's Gully, Longwood, Mount Pleasant, Lenswood, Upper Sturt, Lobethal, Adelaide, Clarendon, and Gumeracha, representing the Hills Districts, held their Annual Conference at Gumeracha on 27th August. Mr. J. Martin (Lenswood), "Spray Plants and Spray Materials"--Mr. C. Pollitt (Blackwood); and a wide range of subjects and questions relating to fruit, sheep husbandry, stock ailments, and pasture management.

There was a very good attendance at the Hills Conference at Gumeracha

Mr. J. B. Randall occupied the Chair, and the opening address was delivered by Mr. A. J Cooke (member Advisory Board of Agriculture). Included in an excellent agenda were the following items:—"Dairying on Sound Lines"—Mr. V. Gurr (Lobethal); "The Breeding of Pigs"—Mr. O. G. Ayton (Adelaide); "Advertising Fruit in Australia"—Mr. R. A. Cramond (Lenswood); "Cool Storage of Fruit"—

The following resolutions were carried:—"That this Conference asks that the necessary steps be taken to have a committee of growers elected to investigate the advertising and distribution of fruit"; "That the 1937 Conference be held at Mount Pleasant"; "That this Conference of primary producers strongly supports the Government in its attempt to bring in legislation to control the milk supply of Adelaide."

A fine crop of Ghurka Oats on Mr. P. R. Hodge's farm, Nangari.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of August, 1936; also the average precipitation for August, and the average annual rainfall.

Station.	For Aug., 1936.	Av'ge. for Aug	To end Aug., 1936.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta ..	0·18	0·19	2·19	4·62
Marree	0·28	0·36	2·77	5·83
Farina	0·17	0·41	2·88	6·37
Copley	0·55	0·62	3·54	7·85
Beltaña.......	0·55	0·65	4·02	8·47
Blinman	1·03	1·06	4·84	11·81
Hookina	0·97	1·13	6·53	11·18
Hawker	1·08	1·38	6·77	12·22
Wilson	0·87	1·20	7·92	11·77
Gordon	0·68	1·05	5·20	10·46
Quorn	0·73	1·69	6·01	13·15
Port Augusta..	0·58	0·89	5·91	9·40
Bruce	0·65	1·07	8·89	9·74
Hammond	0·90	1·25	7·05	11·11
Wilmington ..	1·45	2·13	12·65	17·28
Willowie	0·92	1·39	7·00	12·22
Melrose	1·77	2·75	16·22	22·85
Booleroo Centre	1·44	1·84	8·73	15·21
Port Germein .	0·59	1·37	7·10	12·53
Wirrabara	1·13	2·44	9·59	19·25
Appila........	1·01	1·72	8·42	14·62
Cradock	0·65	1·11	5·83	10·78
Carrieton	0·79	1·46	7·24	12·19
Johnburg	0·78	1·21	7·23	10·56
Eurelia	0·77	1·58	7·51	12·76
Orroroo.......	1·02	1·56	8·59	13·20
Nackara	1·23	1·12	13·57	11·09
Black Rock ...	0·88	1·46	8·05	12·35
Oodlawirra ...	1·36	1·27	9·62	11·67
Peterborough..	0·85	1·54	8·48	13·22
Yongala	1·07	1·82	10·47	14·43
NORTH-EAST				
Yunta	1·02	0·70	6·14	8·84
Waukaringa ..	0·97	0·71	6·09	7·89
Mannahill	1·18	0·69	4·71	8·16
Cockburn	1·01	0·62	6·25	7·91
Broken Hill ..	1·22	0·78	6·01	9·50
LOWER NORTH.				
Port Pirie	0·83	1·40	8·58	13·19
Port Broughton	1·14	1·67	7·10	13·85
Bute	0·73	1·96	8·49	15·39
Laura	0·92	2·20	10·26	17·97
Caltowie	0·99	2·10	8·97	16·76
Jamestown....	1·36	2·25	10·21	17·72
Gladstone	1·24	2·02	8·51	16·32
Crystal Brook .	0·98	1·95	8·52	15·76
Georgetown ..	1·17	2·25	9·91	18·29
Narridy	1·22	1·96	7·69	15·77
Redhill	1·82	2·19	11·53	16·54
Spalding	1·60	2·46	9·63	18·74
Gulnare	1·54	2·44	10·37	18·59
Yacka	1·45	2·02	9·78	15·38
Koolunga	1·52	1·99	8·13	15·32
Snowtown	1·09	2·12	10·42	15·70
LOWER NORTH—*continued*.				
Brinkworth	1·13	2·07	8·17	15·73
Blyth	1·35	2·03	10·67	16·73
Clare	2·09	3·07	17·41	24·45
Mintaro	1·87	3·32	15·18	23·36
Watervale	2·61	3·62	18·70	26·74
Auburn	2·30	3·04	15·77	23·96
Hoyleton	1·74	2·16	12·79	17·27
Balaklava........	1·17	1·82	8·25	15·43
Port Wakefield ..	0·77	1·47	7·45	12·93
Terowie	1·06	1·63	10·87	13·34
Whyte-Yarcowie	1·06	1·62	11·30	13·58
Hallett	1·96	2·16	10·41	16·41
Mount Bryan....	1·54	2·28	11·34	16·77
Kooringa	1·59	2·20	11·27	17·81
Farrell's Flat ...	1·79	2·53	13·83	18·54
WEST OF MURRAY RANGE.				
Manoora	1·95	2·58	12·20	18·94
Saddleworth	1·96	2·49	14·21	19·59
Marrabel........	2·04	2·75	13·49	19·96
Riverton........	2·17	2·73	14·48	20·79
Tarlee	1·28	2·28	11·60	18·09
Stockport	1·26	2·11	11·67	16·97
Hamley Bridge .	1·17	1·98	9·99	16·52
Kapunda	1·94	2·46	12·31	19·76
Freeling	1·20	2·26	9·53	17·79
Greenock	1·75	2·85	12·90	21·47
Truro	1·85	2·62	12·09	19·79
Stockwell	2·16	2·58	12·63	20·04
Nuriootpa	2·23	2·73	14·11	20·68
Angaston	2·20	2·95	14·51	22·32
Tanunda........	1·95	2·83	13·69	21·94
Lyndoch	1·84	3·16	11·33	23·27
Williamstown ...	2·56	3·79	14·23	27·61
ADELAIDE PLAINS.				
Owen	1·28	1·86	11·24	14·64
Mallala	0·91	1·94	9·25	16·49
Roseworthy	1·33	2·18	9·47	17·42
Gawler	1·26	2·27	10·14	18·85
Two Wells	1·33	1·84	8·90	15·76
Virginia	1·31	2·12	10·53	17·20
Smithfield	1·89	2·25	10·29	17·65
Salisbury	1·82	2·31	8·90	18·56
Adelaide	2·08	2·55	12·12	21·14
Glen Osmond....	2·03	3·25	14·13	25·97
Magill	1·91	3·16	12·47	25·37
MOUNT LOFTY RANGES.				
Teatree Gully ...	1·88	3·44	12·05	27·07
Stirling West ...	4·33	6·34	26·56	46·95
Uraidla	3·76	5·86	22·71	43·95
Clarendon.......	3·64	4·27	19·45	32·79
Happy Val'y Res.	2·61	—	14·39	—
Morphett Vale ..	2·66	2·74	12·69	22·59
Noarlunga	1·79	2·48	12·77	20·33
Willunga	2·15	3·21	13·89	25·97
Aldinga.........	1·51	2·48	11·88	20·21

RAINFALL—*continued.*

Station.	For Aug., 1936.	Av'ge. for Aug.	To end Aug., 1936.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	2·88	3·70	16·69	29·42
Inman Valley	3·90	—	18·46	—
Yankalilla	3·04	2·74	13·41	22·76
Mount Compass	3·49	4·32	20·28	—
Mount Pleasant	2·32	3·62	17·58	27·11
Birdwood	2·49	4·04	15·59	29·07
Gumeracha	2·64	4·59	15·70	33·31
Millbrook Res.	2·84	4·97	16·73	34·47
Lobethal	3·27	5·06	19·34	35·91
Woodside	2·66	4·45	16·37	32·15
Hahndorf	2·78	4·83	17·37	34·77
Nairne	2·33	3·61	15·93	28·12
Mount Barker	3·09	4·16	17·31	31·24
Echunga	3·80	4·29	20·84	33·25
Macclesfield	2·74	3·88	19·04	30·34
Meadows	4·00	4·58	21·57	36·02
Strathalbyn	1·23	2·35	13·55	19·32
MURRAY FLATS AND VALLEY.				
Meningie	1·75	2·18	12·02	18·31
Milang	1·46	1·68	11·28	14·89
Langhorne's Ck	1·02	1·74	12·01	14·91
Wellington	0·91	1·66	11·56	14·65
Tailem Bend	0·88	1·72	12·68	15·06
Murray Bridge	0·80	1·48	10·95	13·51
Callington	1·01	1·83	10·28	15·15
Mannum	1·43	1·26	9·42	11·48
Palmer	2·30	2·05	13·88	15·59
Sedan	1·54	1·50	8·23	12·05
Swan Reach	0·77	1·15	7·79	10·65
Blanchetown	0·79	1·10	8·16	11·01
Eudunda	1·53	2·24	13·37	17·15
Point Pass	2·26	2·55	14·44	16·72
Sutherlands	0·77	1·34	8·56	10·81
Morgan	0·52	0·94	6·52	9·16
Waikerie	0·62	1·04	9·20	9·66
Overland Corner	0·33	0·98	8·57	10·25
Loxton	0·78	1·31	8·66	11·50
Berri	0·53	1·22	8·84	10·13
Renmark	0·35	1·07	9·94	10·38
WEST OF SPENCER'S GULF.				
Eucla	0·95	0·95	5·85	10·02
Nullarbor	0·82	0·97	4·14	8·85
Fowler's Bay	1·05	1·47	7·50	11·19
Penong	1·10	1·66	7·38	12·22
Koonibba	1·88	1·73	7·41	12·09
Denial Bay	1·34	1·60	7·54	11·19
Ceduna	1·05	1·39	6·73	10·21
Smoky Bay	1·27	1·43	6·26	10·42
Wirrulla	0·78	1·67	5·20	10·51
Streaky Bay	1·98	2·01	8·39	14·85
Chandada	1·61	2·17	5·92	12·42
Minnipa	1·17	1·99	8·15	13·91
Kyancutta	1·24	1·95	7·99	12·77
Talia	2·31	2·25	8·02	14·76
Port Elliston	1·51	2·35	8·27	16·51
Look	1·37	2·66	8·59	16·34
Mount Hope	1·77	—	10·07	—
Yeelanna	1·98	2·47	8·97	15·94
Cummins	2·02	2·78	9·62	17·58
Port Lincoln	1·93	2·68	10·68	19·37
Tumby	1·27	1·81	7·96	14·25
Ungarra	1·49	2·28	9·49	16·87
Port Neil	1·06	1·56	7·20	13·11

Station.	For Aug., 1936.	Av'ge. for Aug.	To end Aug., 1936.	Av'ge. Annual Rainfall.
WEST OF SPENCERS GULF—*continued.*				
Arno Bay	0·98	1·50	6·16	12·71
Rudall	0·90	1·77	6·89	12·98
Cleve	1·09	1·83	8·28	14·88
Cowell	0·52	1·13	7·38	11·07
Miltalie	1·04	1·54	8·01	13·70
Mangalo	0·74	1·79	9·85	13·86
Darke's Peak	1·16	2·27	8·12	15·08
Kimba	0·82	1·65	5·29	11·68
YORKE PENINSULA.				
Wallaroo	1·15	1·57	7·51	13·97
Kadina	1·34	1·89	7·65	15·60
Moonta	1·03	1·71	6·72	15·06
Paskeville	1·04	2·11	11·07	15·47
Maitland	1·82	2·56	9·57	19·85
Ardrossan	1·47	1·79	7·50	13·95
Port Victoria	1·77	1·89	7·23	15·41
Curramulka	2·04	2·32	9·37	17·81
Minlaton	1·94	2·39	9·33	17·74
Port Vincent	1·21	1·84	7·03	14·38
Brentwood	2·09	2·01	7·74	15·54
Stansbury	2·13	2·17	9·17	16·81
Warooka	2·45	2·39	9·05	17·44
Yorketown	2·00	2·23	8·33	16·83
Edithburgh	2·03	2·07	8·07	16·37
SOUTH AND SOUTH-EAST.				
Cape Borda	3·96	3·45	17·17	24·80
Kingscote	2·16	2·55	10·23	19·16
Penneshaw	2·27	2·61	11·52	19·00
Victor Harbour	1·88	2·56	13·54	21·40
Port Elliot	1·95	2·37	14·32	19·94
Goolwa	1·64	2·06	13·37	17·86
Maggea	0·44	1·29	9·42	10·20
Copeville	0·70	1·36	11·31	11·53
Claypans	0·61	1·46	9·91	10·42
Meribah	0·74	1·03	10·19	11·32
Alawoona	0·76	1·15	9·76	10·40
Caliph	0·64	1·60	8·91	10·98
Mindarie	0·74	1·55	16·66	12·23
Sandalwood	0·93	1·72	11·46	13·64
Karoonda	0·96	1·90	11·16	14·17
Pinnaroo	0·64	1·70	10·19	14·36
Parilla	1·04	1·71	10·52	13·72
Lameroo	1·06	1·88	11·26	15·87
Parrakie	1·00	1·96	10·17	14·56
Geranium	1·06	2·23	10·54	16·36
Peake	0·93	2·06	10·17	15·93
Cooke's Plains	1·00	1·86	12·05	15·28
Coomandook	1·01	2·15	11·62	17·03
Coonalpyn	1·81	2·15	12·53	17·61
Tintinara	1·93	2·24	12·60	18·62
Keith	2·63	2·18	12·72	17·93
Bordertown	2·61	2·23	12·56	19·14
Wolseley	2·53	2·24	12·60	18·47
Frances	3·23	2·50	14·63	20·08
Naracoorte	3·31	2·78	14·69	22·63
Penola	5·20	3·32	15·39	25·96
Lucindale	4·29	3·05	17·61	23·38
Kingston	3·87	3·10	17·43	24·24
Robe	3·94	3·30	17·24	24·64
Beachport	4·97	3·54	20·40	27·06
Millicent	6·03	3·88	22·30	29·83
Kalangadoo	6·19	4·12	20·91	32·20
Mount Gambier	4·86	3·88	18·51	30·37

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Adelaide, 9th July, Annual Meeting, 7th August, Address—H. B. Barlow; Alma, 18th August, Annual Meeting; Appila-Yarrowie, 7th August, Address—F. C. Gross; Balaklava, 24th August, Social, Balumbah, 25th August, Combined Meeting; Beetaloo Valley, 30th July, "Rotational Cropping"—E. L. Orchard; Blackheath, 6th August, Paper from *Journal*; Blewett Springs, 11th August, Inaugural Meeting; Blyth, 31st July, Annual Meeting, 7th August, Address—A. L. McEwin, Boor's Plains, 13th August, Annual Meeting; Brimpton Lake, 20th August, Discussion—Congress, 6th August, Paper—J. Clothier; Brinkley, 5th August, Visit by Murray Bridge Members; Brownlow, 29th July, Paper—A. R. Steinborner, Cambrai, 5th August, "Poultry"—J. Baker, "Farm Horses"—R. Pietsch; Chilpuddie Rock, 4th August, Discussion; Collie, 5th August, Annual Meeting; Coonalpyn, 29th July, 3 Papers; Coonawarra, 25th June, "Planting Pastures"—N. J. McBain, 16th July, Debate—"Sheep for Wool *versus* Sheep for Meat," 6th August, Annual Meeting; Currency Creek, 9th June, Paper, 7th July, Annual Meeting; Devlin's Pound, 11th August, Address C. A. Goddard, Dudley, 28th July, Annual Meeting; Goode, 5th August, Annual Meeting; Green Patch, 30th July, Paper—H. Whillas; 25th August, "Silage"—C. Stephens; Hanson, 28th July, Annual Meeting; Hartley, 29th July, Formal; Hilltown, 31st July, Address; Jamestown, 27th July, Question Box; Kalangadoo, June, Annual Meeting; Karte, 5th August, Paper from Conference; Ki Ki, 15th August, Annual Meeting; Kilkerran, 3rd August, Annual Meeting, Paper—A. Sawade; Koppio, 5th August, Discussion—Pastures; Kyancutta, 4th August, Annual Meeting; Lameroo, 21st August, Annual Meeting; Lenswood and Forest Range, 27th July, Question Box; Light's Pass, 7th August, Annual Social; Marama, 4th August, Annual Meeting; McLaren Flat, 11th August, Address—G. Ward; Meadows, 4th August, Discussion; Monarto South, 15th August, "Handling Horses" T. P. B. Bretag; Morchard, 7th August, Annual Meeting; Mount Bryan, 5th August, Annual Meeting; Mount Compass, 6th August, Address—H. B. Barlow; Mount Hope, 4th August, Paper, "Drill *versus* Combine"—A. D. Myers; Mount Pleasant, 12th July, Annual Meeting; 5th August, Paper—"Foundation of a Flock"—A. L. Starkey; Murraytown, 15th August, "Homestead and Outbuildings"; Myponga, 12th August, "Cheese Making"—W. N. Rule; Nantawarra, 29th July, "Wimmera Rye Grass"—C. H. Belling; Narridy, 1st August, "Circulation of the Blood"—E. W. Richards; Nunjikompita, 6th August, Address—W. H. Brownrigg; O'Loughlin, 4th August, Formal; Palabie, 31st July, Annual Meeting; Paruna, 12th August, Wool Classing—C. A. Goddard; Penola, 14th August, Discussion; Penwortham, 29th July, Annual Meeting; Petina, 28th July, Annual Meeting; Port Elliot, 18th July, Annual Meeting; Roberts and Verran, 29th July, Paper—A. T. Cowley; Rosedale, 3rd August, Formal; Saddleworth, 1st August, "Pastures"—F. Coleman; South Kilkerran, 3rd August, "Care of Machinery"—A. Bittner; Springton, 5th August, Paper—F. R. Johnstone; Stockport, 24th August, Annual Meeting; Strathalbyn, 12th August, Papers by High School Boys; Sutherlands, 6th August, Annual Meeting; Tantanoola, 8th August, Address—E. S. Alcock; Taplan, 30th July, Question Box; Tarlee, 21st July, Annual Meeting, Paper; Truro, 19th August, Visit to Railway Workshops; Warcowie, 12th August, Annual Meeting; Weavers, 10th August, "Kangaroo Island"—J. Lade; Williamstown, 21st August, Annual Meeting; Wilmington, 11th August, Paper from *Journal*; Wirrilla, 4th July, 20th Annual Meeting, 1st August, Visit by Saddleworth Members; Yandiah, 10th July, Papers, 14th August, Annual Meeting; Yundi, 12th August, "Saw Sharpening"—Mr. Symonds.

Blacksmithing on the Farm.

[Paper read by Mr. T. BARLER at a meeting of Roberts and Verran Branch on 4th June, 1936.]

All farms should be equipped with a blacksmith's outfit. That is to say, forge, anvil, tongs, chisels, punches, and two or three different-sized hammers. This should be sufficient outfit for the average farmer to effect repairs. One can accomplish much in the blacksmith shop on a wet day, using up scrap iron in the the making up of S-hooks, eye-bolts, shackles, bridle swings, and various other articles in everyday use. Often one sees discarded implements standing in his neighbour's yard which if taken apart can be made very useful worked into its proper place. For instance, a disc plough out of commission and an old drill were both pulled to pieces, and by combining the two a fire rake was constructed. All that was bought was a few pounds of rivets to rivet the teeth to the drawbars. Whilst the rake does not present a tradesman-like finish, it does a job equal to a factory made implement. The above shows what good use apparently useless implements can be put to. In making up bridle swings allow 16in. to the horse. For instance, a 10-horse swing will require to be 13ft. 4in. in length; it does not matter if it is 14ft. long. A good bridle can be made up out of old pieces of bullock chain. Always use good heavy iron for making the spreader links and centre ring Welding may present some difficulty at first, and will require a little practice before one can make a successful weld. Two of the main factors are a clean fire and a quick heat. Watch the iron carefully so as not to burn it. When white hot or, say, just beginning to melt, is generally the right heat, but it will be found that different iron will require different heating. Scarfing for welding is also important. Dump the iron well, scarfe short, and lay over neatly, and when correctly heated no difficulty is experienced in making the weld.

Hook Making.—Almost any piece of iron can be made into a hook. A piece of flat iron, say, 1in. by ½in. beaten round, makes a good plough chain hook. Great care should be taken in the shaping of a hook. The eye and bottom of the hook should be in direct line with the chain, thus bringing the pull into the centre of the hook. A hook thus shaped will outlast three or four hooks wrongly shaped, for it will wear right out, whereas a wrongly-shaped hook will wear a little, and then, because of undue strain, will break.

Eye-Bolts.—In making eye-bolts the end needs to be tapered. Allow plenty of iron, and make a large eye so that when the eye wears through it can be laid over and welded up, thus giving the eye-bolt a double period of service.

What we owe to the Agricultural Bureau.

In a paper read at a meeting of the Gumeracha Branch on 6th April Mr. B. Cornish stated:—The Bureau has been in existence a good many years, and is under Government patronage and assistance. It exists to aid the man on the land. Previous to its existence young men and others interested had to get their knowledge and experience almost solely from their own efforts or from their parents or friends. Now the Bureau fills a great gap. The experts in the Government service are sent out to the Bureaux and their scientific knowledge is made available to members. The *Journal of Agriculture* is printed and sent to members almost free of cost to them. From it can be obtained statistics of experiments and operations by Government departments, and specially of Roseworthy Agricultural College, giving much valuable information to men on the land. Much knowledge may also be obtained from the reports of Bureau meetings all over the State. Although conditions are different here to many parts of the State, yet much can be learned from these reports.

Everyone engaged on the land, up to long past middle age, should be a member of the Bureau. It seems a great pity to me that so many people getting their living from the land take no interest in the organisation, and their neglect in becoming members shows a great want of appreciation of what the Government is doing in this direction. What then do we owe to the Bureau? (1) We owe to the organisation that we should be a member and take an active part in its operations, place all our experience at its disposal, and strive to get the greatest possible amount of good from it, otherwise we do not appreciate what is being done for us. (2) We should attend all the meetings possible, and in doing so be punctual. There is great need of improvement in this particular. Some people are noted for a lack of punctuality. Where such people are officers, organisations get into the same very bad habit, and public meetings controlled by them can be reckoned to start at least half an hour behind the appointed time; this shortens the time allotted. It is quite the usual thing in some places to hear people (when it is time to start) say, "No hurry. They won't be starting for half an hour yet." Hindrances occur, especially where long distances have to be travelled. That cannot be avoided, but it is the fact that the long-distance person is usually there first, and the nearest man is the latest.

When any expert or lecturer is sent out to the Bureaux members should be determined to be present if at all possible, otherwise it reflects on the members, is an affront to the department which sends them, and shows that members are not worth the expense.

Should Wheat be Grown outside of Goyder's Line?

In a paper read at a meeting of Warcowie Branch on 2nd June Mr. E. C. Jarvis stated that a good deal of country outside of Goyder's Line was more suitable for wheatgrowing than for grazing. When seasons were good it would produce a lot of wheat, and in bad seasons it was not even of much use for grazing. A big mistake had been made when land was cut up into small blocks to encourage so many people to settle in the district. An area of from 3,000 to 5,000 acres within a reasonable distance of the railway would make a good mixed farm. Storing fodder to tide one over dry periods seemed to be unsatisfactory, as the dry periods lasted too long It was better to sell stock at market prices when feed became scarce. As it was not convenient to dispose of horses in that way, it would be advisable to use a tractor. A little wheat should be sown each year, as one never knew how the season might turn out, With a tractor one could always sow a greater area after a general break in the season. It was doubtful whether the production of the district had been increased by farming activities. It was true that certain individuals had benefited by growing a good deal of wheat, but the cost of stock feeding during dry seasons had not only absorbed their profits, but had usually put them in debt. However, the State should assist farmers until seasons improved. A succession of good seasons would put most farmers out of debt. Some would then be able to sell out to their neighbours at a reasonable price, and thus matters would eventually right themselves. For grazing purposes one man could not properly handle a big area of the land in the district, because in good seasons flies and rabbits caused much damage, and were difficult to keep in check on a large holding.

Tree Planting.

[Paper read by Mr. G. Henderson at a meeting of the Nantawarra Branch on 11th June, 1936.]

Having chosen a site for tree planting prepare the ground by ploughing deeply from 12in. to 15in. Of course, this is only possible where the ground can be ploughed with a single-furrow dam-sinking plough. With the old mouldboard plough break up the ground as deeply as possible. If one cannot plough deeply enough the first time, plough it again crosswise. If on the side of a hill plough the ground across the slope so that the water will soak in instead of draining away from the trees. If unable to plough the soil one must get to work with the pick and shovel and crowbar, and dig holes 2ft. square by 3ft. deep. If there is plenty of soil handy do not put the subsoil back in the hole, but fill with top soil. The next thing is to give each hole a thorough soaking, and keep watering until ready to plant the trees. For general planting for shade purposes plant the trees 20ft. x 20ft. This spacing would also make a good breakwind and shelter for farm buildings.

Having prepared the ground for planting, erect a substantial fence with wooden posts spaced ½ a chain apart and iron standards. For wires use two good barbs. Next place rabbit-proof netting on the inside of the fence, and the trees are fortified against one of their greatest enemies—the cow. The pest which runs the cow a good second is the rabbit, for rabbits will do more harm amongst young trees in a single night during the autumn than the grasshoppers did amongst the greenfeed.

Planting the Trees.—Choose a cloudy, dampish day, and get the trees in and fill the holes with well-pulverised soil. Avoid putting any lumpy soil back into the hole. Now give the trees a thorough soaking; continue watering until they get well rooted. Do not keep throwing water around the trees, because this has a tendency to bring the roots to the surface. By giving them a good supply at a time the water soaks into the subsoil, and naturally the roots will go down to get their supply of water. Once they penetrate the subsoil the trees need very little attention. It is a good plan after a watering to give the ground a good raking with a garden rake. As soon as the trees are planted get some mallee stakes and drive three into the ground; cut the bottom out of some old bags (super bags are just the thing), and stretch one over each tree to protect them from the cold winds during winter months.

Care of Flock Breeding Ewes.

SELECTING EWES FROM A MERINO FLOCK.

[Paper read by MR. H. H. JAFFREY at a meeting of the Baroota Branch on June 8, 1936.]

In selecting flock ewes, it is necessary to try in small flocks to get a uniform class of ewes, with large frames, plain bodies, and an even type of wool. The best time for selecting flock ewes is at shearing time. Cull out any weedy, inferior-wool sorts, cut teats, and wrinkly-tailed types, which are subject to flies. The selected ewes should be dipped, placed in a separate paddock and kept in fair condition. Early in December the ewes should be well crutched, and eye-clipped. Proper crutching is one of the best preventives of the fly pest. It is unprofitable to wait for sheep to become dirty or struck by flies before you think it necessary to crutch. Uncrutched sheep do not only stain breech wool, but when struck by flies it also wreaks havoc with the sheep. After crutching is completed the rams should be joined for about 6 to 8 weeks. Ewes mated the middle of December should commence to drop their lambs from the middle of May to the middle of June, the gestation period being 154 days. During this time the ewes should be well looked after as regards feed and water and should be handled as little as possible. During lambing they should be in a handy paddock, so that they can be well watched and not roused or disturbed by dogs. If feed is short at this time it is necessary for the ewes to be hand fed, as ewes short of feed have no desire to mother their lambs.

Tailing should be done when lambs are a fortnight old.

Wheat versus Sheep in Marginal Areas.

[Paper read by Mr. L. H. DANIEL at a meeting of the Kyancutta Branch held on July 7, 1936.]

With the advent of adverse seasons and low prices for wheat there has been a decided move toward a change over from wheat to sheep. This change has been gradual for two reasons; first the farmer has become more or less proficient in the art of growing wheat, he has accumulated equipment which is almost essentially a wheat grower's equipment and he has acquired a liking for the work, toilsome though it may be, and he is therefore reluctant to change over to a work entirely different, and about which he knows little or nothing. Secondly, the lack of finance has seriously handicapped him. Fortunately, the various stock firms which serve us are giving us valuable assistance in this direction.

By the term "marginal areas" is meant those areas which are considered by many to be close to a margin over which farming is considered hopeless on account of scanty rainfall.

We are indebted to Professor Perkins for a very valuable report on wheat growing throughout the State just prior to his official retirement from the Department of Agriculture. His report appears fully in the May, 1936 issue of the *Journal of Agriculture.* However, it is not fair to condemn whole hundreds for wheat growing because the hundred has averaged, say, under six bushel per acre over a period of 20 years, and particularly the 20 years we have just completed. It must become much more of a personal matter than that. There are some farmers in every hundred who will always make a success of wheat growing over a period of years, and it is best left to their discretion whether they carry on with wheat, or not. It is the farmers who can be termed "scratchers" who must be condemned. It is their returns which drag our averages down so low. They are the ones which must be "culled out," if any. The term "tickle it with a rake and it will laugh with a harvest" no longer applies, and they have got to realise it. There are many farmers in the nine inch rainfall areas who are making a success of wheat growing, and the best way to make farming a payable proposition for them, and others, is to wipe out their debts, and reduce their taxes and costs so that they shall not accumulate these debts in the future.

It will be noted by the Professor's map that there are several hundreds in the mallee south of the Murray on a rainfall of nine inches or less which have averaged from 6.16 to 8.57 bushels over a period of 20 years. This may be due to underground water supplies, as the writer knows by observation that there is a plentiful supply of water in that area, or it may be due to good farming methods. There is also the hundred of Petina above Streaky Bay which has averaged 7.01 bushels on a nine inch rainfall. This shows that even with a rainfall as low as nine inches per annum wheat growing is by no means hopeless if tackled properly.

Assuming that wheat growing can be continued with safety in these marginal areas, let us now consider the price of wheat and the cost of production. I have prepared a Table showing the receipts and expenditure on producing a wheat-crop on a typical farm in this area, having 400 acres of wheat in crop. These figures are based on actual experience, so can be relied on. The table covers a period of twelve months, beginning March 1, 1934, and ending February 28, 1935.

Table A.—Showing the profit on a 12 bushel crop and expenses incurred; also showing the loss or profit on varying yields.

RECEIPTS.	£	s.	d.
400 acres wheat at 3s. 0½d. bushel.			
Yield- 7bush. per acre	425	16	8
Expenses	498	8	8
Loss	£72	12	0

	£	s.	d.
Yield—8bush. per acre	486	13	4
Expenses	498	8	8
Loss	£11	15	4

	£	s.	d.
(Bedrock.)			
Yield--9bush. per acre	547	10	0
Expenses	498	8	8
Profit	£49	1	4

	£	s.	d
Yield— 10bush. per acre	608	6	8
Expenses	498	8	8
Profit	£109	18	0

	£	s.	d
Yield—11bush. per acre	668	3	4
Expenses	498	8	8
Profit	£170	14	8

	£	s.	d.
Yield— 12bush. per acre	730	0	0
Expenses	498	8	8
Profit	£231	11	4

EXPENDITURE.	£	s	d.
14 tons 45 per cent. super and freight	63	14	0
Cartage from siding at 2s. 7d. ton.	1	16	2
Copper carbonate	1	8	0
Combine repairs	4	13	3
Harness repairs	4	14	0
Stallion fees	9	0	0
Chaffcutter repairs	0	10	6
Telephone	7	8	9
Bolts	0	10	0
Engine repairs	1	7	0
Engine oil	1	2	0
Binder twine	5	19	0
Binder repairs	4	7	6
Cornsacks	47	10	8
Stripper repairs	0	11	3
Various harvest expenses	10	16	5
Harvest wages	4	2	6
Winnower repairs	2	4	7
Wheat carting	22	7	4
Machine oil	2	4	0
Blacksmithing	5	9	1
Plough-shares	1	2	6
150 bags seed-wheat at 3s. 0½d. bushel	68	8	9

Expenditure—*continued.*	£	s.	d.
Water rates	27	18	0
Council rates	5	8	4
Land tax	4	7	0
Lease	19	5	7
Shed and tanks	9	0	2
Wages (one man)	78	0	0
Living expenses	52	0	0
Car expenses at 3,500 miles	31	2	4
Total	£498	8	8

It is gratifying that there is a reduction of 17s. 6d. per ton on Superphosphate for this year. This means a big help to the farmer. You will notice that I have not included insurance premium. Personally I regard insurance as a gamble, and an unnecessary evil, and have nothing to do with it. I have compiled these figures from the viewpoint of the farmer being right out of debt and therefore free from forced insurance. Interest has also been left out for the same reason, except on unavoidable items such as the lease and shed and tanks. The water rates, council rates and land tax are a fair indication of rates in marginal areas.

I have calculated the price of wheat at 3s. 0½d. per bushel as an indication of the average price received at country sidings during last year.

It will be noted that a nine bushel average with wheat at this price is necessary to show a profit on these expenses. Every additional bushel per acre on 400 acres at this price means £60 16s. 8d. to the farmer, and so is well worth striving for. Personally, the crop on which the expenses were incurred averaged twelve bushels, despite two severe dry spells received during the growing period, so the expense was well warranted.

Let us now consider sheep alone as a livlihood in order to determine the relative profits on wheat and sheep, as they are our two main products. The same side lines can be worked with either. The figures I have compiled on sheep are partly theoretical, as it is a pursuit which is comparatively new to me. Sheep with wool at 6d. per lb. is infinitely more interesting and easy than wheat at 3s. per bushel, but I do not agree that it is more profitable. In fact, wool at 1s. 1d. lb. is not as profitable as wheat at 3s. 0½d. bushel, providing a normal year is experienced. Table B shows the receipts and expenditure on a flock of 400 Merino ewes.

Table B.—Showing the profit on keeping a flock of 400 Merino ewes for 12 months, averaging 11lb. of wool per ewe; also showing effect of an extra pound of wool per ewe.

Receipts.	£	s.	d.
Wool from 400 Merino ewes at 11lbs. per ewe at 1s. 1d. per lb.	238	6	8
Sale of 250 lambs at 12s. 9d.	159	7	6
Total	£397	14	2

	£	s.	d.
Receipts	397	14	2
Expenditure	325	13	6
Profit	£72	0	8

	£	s.	d.
At 12lbs. wool per ewe	419	7	6
Expenditure	325	13	6
Profit	£93	14	0

Expenditure.	£	s.	d.
Sheep dip powder at 1 packet per 100 sheep	2	0	0
Crutching at 8s. per 100 sheep	1	12	0
Arsenic swab	0	4	8
Superphosphate (for grain and fodder), 4½ tons 45 per cent.	19	2	6
3 tons superphosphate for sowing with grasses, or top-dressing	12	15	0
Freight on super	1	17	6
Carting from siding at 2s. 7d. ton	0	19	4
Combine repairs	2	6	7
Harness repairs	2	17	0
Chaff-cutter repairs	0	10	6
Telephone	7	8	9
Engine repairs	1	7	0
Engine oil	1	2	0
Binder twine	5	19	0
Binder repairs	4	7	6
Winnower repairs	1	2	3
Machine oil	1	4	0
Blacksmithing	2	14	6
Water rates	27	18	0
Council rates	5	8	4
Land tax	4	7	0
Lease	19	5	7
Shed and tanks	9	0	2
Living expenses	52	0	0
Wages (one man)	78	0	0
Crutching again at 8s. 100 sheep	1	12	0
Arsenic swab	0	4	8
Shearing at £2 per 100 sheep	8	0	0
Various shearing epxenses	2	17	6
12 wool bales at 3s. 8d. each	2	4	0
Freight on wool at £1 bale	12	0	0
Carting wool to siding	0	3	10
Car expenses for year at 3,500 miles	31	2	4
Total	£325	13	6

Dipping sheep is absolutely essential to prevent lice. I have omitted dipping charges on the principle that each farmer should dip his own sheep in a proper dip, or an improvised one, and see that it is done properly. We will hope that the crutching twice a year and swabbing with arsenic solution will prevent damage by blowfly strike altogether. It is usually necessary to hand-feed sheep from March 1, to end of July in these localities to ensure more and better wool and strong sheep and lambs. Therefore, plenty of oats must be on hand. Five hundred bags of oats will feed 400 ewes at one pound per day over this period, and for this we must sow at least 150 acres of oats for grain and hay. It is necessary to establish better pastures than those we have, and superphosphate is necessary for this. Many of the other expenses, however, are only half what they would be if for wheatgrowing. The rate on water and land unfortunately are the same to date. Let us hope for an improvement soon. A car and telephone are absolutely essential, whether for wheat growing or sheep farming, despite high costs of each.

With a flock of 400 ewes there will be a large percentage of lambs each year. There must be an outlet for the surplus. About 50 lambs will go to replace ration sheep, some more to replace dead sheep. There should be at least 250 others to dispose of. Fortunately the freezers are a valuable outlet for these and deserve all the support we can give them. Twelve shillings and nine pence was the price received last year by the flock I have in mind. On the expenses mentioned the profit is £93 14s. at 12lb. wool per ewe, compared with £231, 11s. 5d. on a 12 bushel wheat crop—quite a substantial difference! It will be noted, however, that I have not calculated the benefit to the land caused by the sheep, which is very considerable, but difficult to calculate in terms of money. Every pound of wool extra on this flock at 1s. 1d. per lb. means £21 13s. 4d. more to the farmer, and is about as difficult to induce as an extra bushel of wheat per acre.

I have not mentioned cost of fencing, as most farmers now have their farms ring-fenced and fairly well sub-divided. I have concentrated on the regular yearly expenses.

I really think that the 20 year period Professor Perkins has in mind has been more abnormal than he admits. I admit the good seasons in the early part of it. Commencing with 1915, mostly good, to excellent seasons then followed until 1927-28, when droughts of the longest duration in our history occurred unil 1929-30. Since then the conditions have been abnormal. Bounties were introduced, and to good purpose in most cases, but they encouraged the farmer known as the "scratcher." In 1931-32 red rust occurred severely throughout the State, rabbits also assumed plague proportions and had devastating effects on the crops. The 1932-33 harvest was badly affected by a hot, scorching wind which in October, 1932, shrivelled the grain in the flowering stage, and reduced the yields enormously all over the State. "Take-all," and hay-die were also prominent. On top of this, in 1933-34 we had a devastating grasshopper plague, which undoubtedly reduced our yields more than any other year. 1935 was our best year since 1927, and it was characterised by two severe dry spells. Nobody expects a recurrence of such a run of trouble.

Professor Perkins reserves judgment as to the future possibilities of the County of Le Hunte, among others. Approximately half of the county is outside Goyder's line of rainfall, yet the average of good farmers is much above that indicated in Professor Perkins's map, and more in the vicinity of 12bush. per acre than 5.80.

Personally, from the figures compiled I am convinced that wheat growing in conjunction with sheep is still the best course, and it is not safe to specialise in either on account of the market fluctuations. What is more, the two blend perfectly. The sheep do the land a wonderful lot of good for wheat growing; and the wheat growing keeps the land in a productive state, and provides a lot of fodder for the sheep. What is more, on holdings of the size we have we could not do enough of the one solely to keep us properly employed.

Care and Management of Horses.

[Paper read by Mr. G. A. Quast at a meeting of the Frayville Branch on 2nd July, 1936.]

A horse should have a thorough cleaning out once a year, so that the animal is clean from worms and Bot Flies. This should be done about July.

Watering Horses.—Horses should have an opportunity to drink when working (in the summer) before and after each feed, that is, 6 times a day. In the winter they will not drink so often, but they should be watered 4 times a day. The question often arises, should a horse drink when hot? If a farmer wants to keep a healthy team he should not let his horses drink when they come out of the chains sweating and hot. They should feed for a while so that they can cool down, and they should be allowed to drink. Care should be taken to see that watering troughs are clean. A good suggestion is to put a quantity of lime in the drinking water occasionally, to clear and clean the water. Everybody should have a separate trough somewhere in the yard with a quantity of salt, so that horses and cattle can lick the salt whenever they like Especially is this necessary where farmers have only rain water for their stock.

Feeding is an important matter, and should be done regularly. A good idea is to put down a stack of new straw (as much oaten or barley straw as possible) for animals to feed at when not working. Each layer of straw, as put down, should be sprinkled with a mixture of 1 part molasses and 3 parts water.

Stabling Horses.—In a number of places the poor horses are seen shivering in a yard with posts and a few wires. If a horse is worth keeping to do the work, the animal is worth a comfortable stable. One member wrote that a horse stable should be open to the north. My experience is that every stable should be built from north to south, with the east side open. The east side will get enough sun to dry the dampness. From the east there is very little wind, but from the other 3 parts of the globe we get a lot of wind in the Murray Flats. A stable should always be well covered with straw, which is warm in the winter and cool in the summer. A stable covered with iron is cold in winter and hot in summer. A stable should never be closed on the 4 sides. Firstly, when the horses are in a closed stable and a fire breaks out at night, the poor animals must burn to death, whereas in an open stable they can break their ropes and get free. Secondly, the smell can disappear from an open stable more freely than from a closed stable. Every horse should be tied up, and each one should have his stall of not less than 5ft. wide. A stable should be built against a rise as much as possible, so that the urine drains away from the stable. When horses are tied up they get the feed that is given them, but when they are allowed to roam about, the strongest ones get the best feed, and the weaker animals must be satisfied with the inferior food. Collars should always be hung on the peg with the lining away from the post in order to protect the lining, followed by the bridle with the nose band away from the collar.

Horses and foals (Clydesdale x Percheron).

Grooming.—Each horse should be groomed all over, and care should be taken that the sweat from the previous day's work is cleaned off the shoulders. The shoulders should be groomed *with* the hair, not *against* it.

Care of Legs and Hoofs.—The hoofs should be examined now and then, and the frog should be cut out and cleaned. Puffed legs should be blistered. Lumps on knees are mostly caused by wooden floors. Care should also be taken of the horse's mouth. Generally when a horse slobbers in his food it has either sharp edges on its teeth cutting the tongue or the cheek, which should be seen to at once; or some teeth may be longer than others, which should be cut off. The animal might have some hollow teeth, which should be drawn.

Harnessing and Sore Shoulders.—Everybody should work his horses with good fitting collars, not too tight and not too loose. The hames should fit neatly, not with the bottom ends hanging several inches below the collar. Horses are sometimes worked with bags packed under the collar with the seams not opened; others are put to work after a long spell and are hardly given time for a spell. It is no wonder that horses get sore shoulders. Sore shoulders are mostly caused through carelessness, lack of humanity and bad management. When horses are put to work, care should be taken that the chains are both equal—use split links, not wire. The swings should be at the lowest 2ft. 10in. from eyebolt to eye-bolt. All mane hair should be taken out from under the collar, and couplings should not be too long. Always see that all horses walk straight. When working horses after a long spell, care should be taken during the first 3 or 4 days that the animals are taken very steadily. A team that is free should be allowed to cool their shoulders more frequently than a slow team; say every round, or on a long round, twice a round. When you stop your team always pull them back so that they stand loose in the chains and that the air can draw through the collars and shoulders. That will prevent the shoulders from scalding. Great care should be taken that no lumps, knots, ridges, seams or mane hair are between collar and shoulder. Care should also be taken that a mare in foal is not put into a tight pull, for if she slips or gets a jerk in most cases she will slip her foal. Before putting a mare to the horse see that she is clean. A clean mare in most cases, is in foal after put to the horse. A mare with foal at foot should also be given a little work now and then, to keep her strong in condition, for a foal sucking a mare draws her condition down and weakens her. If a team is handled on the lines suggested, the owner will have a good team at the end of the season, with no sore shoulders.

Diary of the Past Year.

[Read by MR. C. B. MIBUS at the Annual meeting of the Koonunga Branch on July 1, 1936.]

As weather conditions had been satisfactory during the preceding months, the general aspect was fair. The previous year closed with 204 points of rain in June, and all crops had a good chance to germinate. With phenomenal weather during July the aspect became almost critical, as this is the month in which the most rain is expected and only 198 points fell. One of the most uncommon happenings of the month was a hazy dust, which blew up on the 18th, and continued all through the night, with a severe storm all day on the 19th. Only 37 points of rain followed. In August conditions became more favourable, frost became lighter, and a good rainfall of 334 points made crops flourish. The early days of September saw the end of all vine pruning, and the light rain, which amounted to 187 points, scattered well over the month, was favourable for ploughing. Weather conditions kept very favourable during October when 274 points of rain were registered and all through November when only 68 points were registered, which gave the hay crops a good chance to ripen and finish into a good quality hay. During December weather was very favourable to all farmers in the district with only four damp days totalling 37 points to interfere with the harvest, which was quite a success in its yield. The new year opened with plenty of rain; 189 points were registered, all during the time when fruit growers were drying a bounteous apricot harvest. Despite the weather very little damage was done. February registered 102 points and March 65 points of rain, so the grape harvest had every chance of being a success, but as some varieties proved to be a very light crop, the harvest was one of the lightest for several years. April favoured the early seeding with 117 points, which gave the forthcoming year a good start. May was a very light rainfall, so that farmers had every opportunity to make a fine job of their seeding. On May 30, the heaviest rainfall was recorded for the year, being 121 points, making a total of 136 points. June has been very favourable also, with 138 points of rain. Frost has been severe on several occasions; also a hail storm not to be forgotten, but no damage has been recorded. With a well scattered rainfall all last season we have been able to collect a fair average harvest, and as things are progressing favourably again now, we might expect to be able to look forward to another good yield of our primary produce.

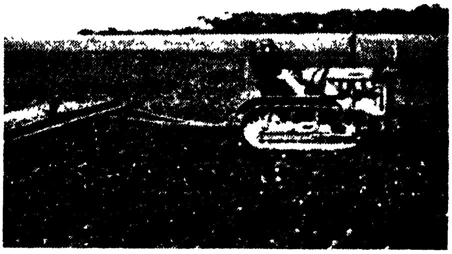
Tractor versus Horses on the Small Farm.

[Paper read by Mr. L. S. DUCKMANTON at a meeting of the Hilltown Branch, on 7th July, 1936.]

Costs.—From a point of view of costs, which is at all times a primary consideration, the tractor has a slight advantage over horses, in so far that on the small farm there is necessarily so much time that the horses have to be fed when they are not actually working. During April (part), May and part of June I cultivated, twice, 100 acres of land, ploughed 25 acres, and then sowed and harrowed the 100 acres for the cost of £8 15s. for kerosene, £1 5s. for petrol, and £2 12s. for oil, making a total cost of £12 12s. with the tractor. To feed 10 horses for the same period (8 weeks) would need 9 tons of chaff at £2 10s. per ton, making the cost of horse feed £22 10s. That is feeding on chaff alone with the addition of crushed oats; of course the amount of chaff used would not be so great, but the cost of the crushed oats would quite make up the difference.

Labour.—The labour attached to feeding a team of horses is greater than some people realize. There are so many handlings of the feed. It has to be cut with the binder, stooked, carted to stack, unstacked and carted to chaffcutters, chaffed, fed to horses, and finally carted out of the stable, which totals seven times handling. For a team to do well it is also necessary for them to be groomed, and that also is ¾ to 1 hour's work every morning. With the tractor the fuel or feed is simply pumped into the tank and when used is blown into the air. Of course the tractor has to be cleaned periodically. This is a few hour's work also, but it is not an every day job.

The tractor is a decided adjunct to the man on the small farm, as it allows him the time to do the hundred and one odd jobs that have to be done in the daily life of every farmer and still get his work done in good time. When he is working horses such jobs have to wait in lots of cases, except the very pressing ones, until the job in hand is completed. Then they have accumulated so much that it is a day or perhaps several days' work to get them out of the way.



Care.—There is one aspect of the position that is made very clear to the owner of a tractor, and that is abuse. There are often times with horses when they are overloaded, or worked in unfit condition —in some cases extremely so, otherwise there would be no need for such an organization as the S.P.C.A. This is a condition that cannot be met with when tractors are working, because if the machine is not in perfect working order it will not work well for long and when overloaded will soon "give up the ghost." If a farmer neglects to keep his tractor in good repair he is laying up trouble for himself, in that when the machine refuses to work any longer through neglect, the repair is much more costly than if attended to when the fault is first noticed.

Side Lines.—There is more scope for side lines on the small farm when one has not to think of feed for a team. There is always a certain amount of hay to be cut on any farm with tracks and roadways through the crop, which can be fed to stock other than horses. It does not need a great deal of hay to feed a few cows or sheep through the pastureless time of the year, and either cows or sheep repay the time and feed used in subsistence during those few months of the year.

Whereas a man may become careless and neglect a team of horses and get away with it for a time, carelessness with a tractor very quickly brings disaster. One soon learns to be on the alert at all times for signs of the wear which must from time to time take place in the machine which is working under a load all the time, and one attends to it before the wear in one part sets up trouble in some other part, making repairs double and sometimes much more costly.

The greatest disadvantage with a tractor is the old enemy deterioration and the inability to offset it with natural increase, as is possible in the case of horses. One cannot breed tractors, but with horses one can usually breed at least one foal a year and so keep the team young and efficient, beside after some years being able to sell one horse a year.

Importance of Feeding for Lamb Production.

[Paper read by Mr. H. J. Hutchesson at a meeting of the Millicent Branch held on June 26, 1936.]

There is a factor essential to high prices, which is not receiving sufficient attention at the hands of many farmers. That is, the condition of each lamb in a consignment. Lambs are being put on the market in anything but prime condition, with a consequent lowering of prices. Every lamb dropped at a certain time may not develop at the same rate as the major portion of the drop, therefore, the slower maturing animals should be held back; undersized and poor conditioned lambs will sell at lower prices. When forwarding lambs to market, select the best. A week or two feeding the slower maturing lambs will mean an advance in price when in market condition. Export lambs cannot be bred unless suitable mothers and abundant feed are provided. The ewes must be well maintained on grass and other succulent feed; fodder should be grown for this purpose. We cannot breed export lambs on natural pastures. Good lambs cannot be expected from poorly fed ewes, they are starved before they are dropped. They have not the constitution and do not thrive, when compared with lambs that are well fed from birth and have never received a setback. Leave nothing to chance in export lamb breeding. Farmers must have reserves of feed. They will be wise to study not only the immediate requirements, but the future, and plan out the scheme of cropping or the growing of grass, so that suitable feed will be available at the right time. Export lamb raising can only be made a payable proposition if attention is paid to correct breeding, mating and feeding. Any check due to a shortage of feed means a decrease in the milk supply from the mother, and a setback to the lamb; therefore, the value of feeding is of very great importance. An uneven system of feed cannot be tolerated if we wish to retain the good name for export lambs. Much has been done in regard to pastures, and much remains to be done. In fact we know very little of what can be done in the growing of pastures. Another important thing is the correct type of ewe to produce an export lamb. Many farmers try to breed from too fine a ewe, with the result that a large percentage of lambs are not fit for export. If you are going in for breeding export lambs, it is better not to study the wool, but to study the lamb, and feed well and get every possible one fat. That will make up for the less returns from the wool of the mother.

Sheep Blowflies.

In a paper read at a meeting of the Monarto South Branch on June 20, Mr. P. B. Frahn stated that a number of farmers and graziers helped to breed blowflies, because whenever any farm stock died they were dragged into the scrub and left unburied. All such carcasses should be buried at a fair depth. When rabbiting, all rabbits should be buried to prevent the breeding of blowflies. Such action was compulsory under the provisions of the Health Act.

The best of the many preparations which the writer had tried was "Carbox." Carbox was mixed with 2 parts of old motor oil or kerosene and 1 part of water. The mixture emitted a very strong smell for a considerable time. Sheep should be well crutched over the tail and about the hind legs in order to keep away all wet wool. Crutching should be done during March or September, just before the times when blowflies were most active. One or two blowfly traps used during the summer months would help to keep down the pest.

Discussion.—Members agreed that carcasses should be buried or burnt. One member who had been trapping blowflies for several years stated that he had caught only a very few of the green species. The flies trapped were mostly those found around the farmyard. It appeared that trapping was not so valuable as some people claimed. The ordinary blowfly did not interfere with sheep. Sheep struck with blowflies should be well crutched, all maggots cleaned off and a weak solution of bluestone applied. The bluestone dried up all sores and caused them to heal quickly; 70 per cent. of the sheep so treated would not be struck again.

Pig Raising in conjunction with Cereal Growing.

In a paper read at the Annual Meeting of the Coonalpyn Branch on June 13, 1936, Mr. C. G. L. Tiller stated that under local conditions it was most profitable to breed one's own pigs, provided that the right type of breeding stock was chosen. One had to forget the old type of pig which was the ideal of our ancestors, the short, thick, heavy pig, almost too fat to walk. The pig to breed for the market requirements was one of great length, with good hams, light in the shoulders, fine in the bone and hair, a pig which could be fed and finished without developing excessive back fat. Pigs should not be kept in sties. Breeding sows should only be brought into farrowing pens about 8 days before they were due to farrow. The only successful method was to have small paddocks and sow them with lucerne, also Dwarf Essex rape, barley, and especially peas. The paddocks should contain the breeding sows and also the growing pigs, which should graze until about 5 months old. At weaning time they needed to be well looked after and given a little pollard and meatmeal. For the next four weeks the pigs should be able to look after themselves, if the paddocks were arranged on a proper system. At 5 or 6 months they should be put into good, clean, well-ventilated sties, not more than 6 pigs of even size in each sty, and fed well on farm-grown crushed barley with a small quantity of meatmeal. Up to the time of placing the pigs in sties they would not have cost more than 4s. or 5s. per head, and 3 bags of barley with meatmeal to the value of 2s. 6d. would produce a pig of 120lbs. weight which would return not less than 50s. Barley on the farm was worth only about 6s. per bag, so that a pig should be ready to market at a cost to the farmer of 19s. to 20s. after allowing for work in connection with feeding and handling.

The alternative method to the above was to buy pigs at about 20s. per head. In doing so one was likely to get pigs of all shapes and colours, as well as a chance of introducing any of the ailments to which a pig was heir. On the average it would take 4 bags of barley to make pigs of the stock one could buy, and while still showing a profit, it would not be so remunerative as the former method. However, either method would show a profit over selling barley as grain.

Tree Planting.

In the course of a paper "Afforestation" read at a meeting of the South Kilkerran Branch on 13th July, 1936, Mr. S. W. A. Heinrich stated:—

Many of us are too apt to chop or pull down a tree and not even think of planting another to replace it. We do not want trees scattered all over our paddocks, but, useful place to plant a tree or trees is in a corner of a paddock where one is not likely to have a gate or panel opening. Choose a hardy tree that will give plenty of shade when grown up. Care should be taken not to have a fire too near when burning off a stubble paddock, as some trees, especially pines, will die very easily. It is not hard to put a temporary fence across the corner, which must stop there until the tree is grown up enough so that stock cannot damage it. No valuable land is taken up in that way. Most of us like to see trees, pines or something green around a homestead and they all add to the beauty of the place. Care should be taken when considering planting a tree near the house or sheds. Our forefathers probably did not know that the roots of some trees run for chains, and make for an underground tank. The Peppertree is particularly noted for its thirst in this respect, as well as most big gum trees and many a tank has suffered ill effects thereby. A disadvantage of having tall trees alongside the buildings is that they are apt to lose leaves which fall in gutters that are relied on for carrying the water away, particularly where one has box gutters to contend with. Plenty of green around the place makes for cooler temperatures on hot days, but I hate cleaning out a gutter on a roof as soon as the weather looks threatening. Therefore one should exercise care in choosing a position to plant a tree and what to plant. There are several trees that can be trimmed and grown in hedge form. The Pine, Carob and two other evergreen species. A few fruit trees could be intermixed with harmless shrubs or bushes near the house. With most varieties of fruit, except Oranges and Lemons, the trees are bare throughout the winter months but look all the more refreshing by being green in the summer. Little thought is given, however, to growing a tree or two in the sheep yards or near enough to them to enable the sheep to get shade while being yarded. It seems to me that a mallee tree would have the most value if we could control its shape of growth to a large extent. Mainly it grows hap-hazardly in no uniform shape whatever, but goes whichever way it cares. Other than that it is about the hardiest tree to grow in our district.

Building on the Farm.

The above was the subject of a paper read by Mr. B. E. Schenscher at a meeting of the Monarto South Branch on July 18. He stated that a farmer could do many building jobs for himself and thus save money in the erection of cowsheds, pigsties, and other smaller jobs. Good foundations were necessary. It was a good plan to put down concrete blocks or large flat stones at corners or ends. If the foundations were level it would be much simpler to obtain the correct fall in the guttering. Limestone was preferable for building, as it was easy to work. However, limestone required a good mortar, the stones being mostly short and rounded, so that the lies were not so long as they were with other stone. When walls were erected the most important job from the point of view of appearance was the pointing. Outside stones should not be flushed too much in building, and all rough mortar should be scraped from around the stones. If mortar for pointing was mixed a day before using it would work much better. When using an ordinary trowel for pointing it should be held flat against the wall. By so doing the mortar could be applied much straighter and would look better. A piece of bran bag was used for smoothing, rubbing lightly around the edges of the mortar. When the mortar was fairly dry it could be finished by brushing with a fine brush to remove all loose sand.

Floors could easily be laid, using good, coarse gravel mixed with cement in the proportion of 6-1. When dry enough the floor could be rammed down and cut into squares not larger than 4ft. A better method was to lay the floor in strips, placing a piece of timber covered with paper at the desired width. A 2-1 mixture was preferable for the top coat. When laying the top coat pieces of board about ½in. in thickness placed at the edges would enable one to level the mixture with a straight-edge. When dry enough the floor could be floated, using a wooden float. Dry cement should then be sprinkled over the floor and floated in. Breaks should be left in the top-coat to correspond with the squares in the cement underneath.

Beautifying the Home.

[Paper read by Mr. C. Yelland at a meeting of the Boor's Plains Branch on July 22, 1936.]

How often does one see a well laid out garden which is cut off from the ordinary rural activities? In a number of cases implements and other things connected with the successful working of a farm are left lying around the home. After being out working on an implement it isn't very much relief to finish work and come home to find suggestions of work around one. It is as good as a tonic to see a well kept garden and home after being away all day.

The first essential for a homestead is a number of tidy sheds arranged at a considerable distance from the house. All implements not in use should be in these sheds. Secondly there should be a wall or iron fence around the home to break the wind and keep out stock and poultry, which most farmers have to contend with in the garden. I favour a low wall with either pipes or cyclone wire on the top and with a hedge on the inside. Although one may get the full sweep of the wind with this type, with a high wall or iron fence the wind whirls around and does more damage.

A cyclone self-closing gate, besides adding to the appearance, is as cheap as most others, when convenience and quality are counted. Although the low wall is best for durability, for growing a garden successfully a brush fence stands alone but is a menace from fire and vermin, and if it is not erected by an expert it soon becomes untidy and ragged. Suitable types of hedges for farm use are Coprosma, Pittosporum, Myrtle, and pine.

The laying out of a garden is governed by a number of factors. The foremost is time. The majority of farmers indulge in some side-line such as pigs, cows and poultry, and so have not much time to make their home more attractive. If one is in a good financial position the best idea is to have concrete paths around the garden, thus saving much time and labour in keeping paths free of weeds. At the present price of cement, concrete is the cheapest, but in the event of a rise in the price of cement and a fall in the brick price, as was experienced before the building boom, then bricks, if put down in different patterns, compare favourably with any other form of path.

Crazy paving is very modern and attractive, but it takes too much looking after by anyone whose time is limited. Most gardens of to-day have at least one rockery. Much can be said for and against this type of garden. Where the ground is not suitable for flower beds and has to be built up, a rockery is a very good way of overcoming the difficulty. But where the ground is perfect and very level, people with no natural instinct and imagination, but with just a heap of stones often abuse rock gardening. It is not the amount of rocks, but the natural way of placing them that adds beauty to the garden. Some prefer to have the stones placed on a rockery—the most natural way. I prefer to have them built, because it prevents weeds from growing and slugs and snails from harbouring between the stones. All cement must be hidden behind the stones so as to avoid that wall-like appearance.

Fish ponds will be found in a number of country home gardens now that they are so popular and the prices of fish and aquatic plants are cheaper. A fish pond should have a considerable surface of water, because the most necessary thing in successful fish culture is plenty of oxygen. The pond need not be very deep, aquatic plants are essential in the pond as they generate oxygen. Before putting fish into a new pond fill it first with water and allow it to soak for at least a week; otherwise the magnesia from the cement will soon kill the fish. Two of the most popular and useful aquatic plants are Valisneria and Anarcharis.

Shrubs and fruit trees make an attractive display and do not require so much attention as annuals. The home garden should be planted so that the fruit crop covers a long period, although only a limited number of trees can be grown. The garden should be arranged with fruit trees and vegetables in one section and shrubs, rockeries and flowers in another. If there is an uneven part of a garden that is required to be beautified, a sunken lawn can be planted, thus making it attractive as well as saving the trouble of filling up deficiency in the ground surface.

An avenue of Norfolk Island pines or gums at the entrance of a farm race is another medium of brightening the home. Paint, also, preserves as well as adding attractiveness to the home. Green and cream are favoured for smartness. Some are prejudiced against the green because of its fading, but this can be overcome by the latest fadeless green that is now available. Every home should be painted every two years both for attractiveness and for preserving the woodwork. Unpainted property depreciates 7½ per cent. whereas painted property depreciates only 2½ per cent.

Interior Decoration.—If any of the walls are cracked badly (as such a lot of the older homes are) and have to be putty-coated because the surface is too rough to kalsomine or paint, Craftex, the latest painting device can be applied, and comes out just as cheap as papering with a good wall paper. All walls should be as much in harmony with curtains, light-shades, furniture and furnishings as possible.

The old idea that anything is good enough for a farmer has vanished. If one has the money one can bring city luxuries to the farm.

Investing Capital in a Farm.

In the course of a paper read at the annual meeting of the Yadnarie Branch on 14th July, 1936, Mr. John R. Mackie stated:—

"What is capital? Capital is defined as accumulation of wealth, hence for the purpose of this paper the amount one intends investing in a farm in order to make a living by that investment.

Before proceeding further it may be useful to suggest a way by which an ambitious youth may hope to collect his capital. The quickest and least expensive way in which to do so is to procure a job as a share farmer. Generally speaking only a few years necessitate the amassing of a substantial capital.

Having accumulated the capital required we are in a position to look for a block of land suitable for investment. Several points have to be considered here—locality, type, the possible future and results, and expense in maintenance. Owing to the fact that much land is held from profitable production due to land capitalists, and out of the hands of the younger generation it is useless for a beginner of to-day to interest himself in the most fertile parts of the State. He is compelled to either take an inferior farm or set to work on an uncleared or partially cleared piece of country. The type which would most suitably correspond with one's pocket is a partially cleared block of as good quality as is procurable. There again the young prospective farm owner is faced with the task of endeavouring to wipe out someone else's debt; for it is known that the majority, if not the whole of the partially cleared farms which are put up for sale to-day have a considerable debt on them. Notwithstanding, in the majority of cases, the sub-cleared farm would hold a better financial opening than the outlay on a scrub block at the present day.

However, within a few years the debts on such farms will have to be cancelled or considerably reduced, and then the young farmer will have his chance to continue with the decision of a block. Anyone who is fortunate enough to be land hunting when several blocks of land are vacant must consider the future of all these blocks and determine the best of them. A great deal of consideration must be given to the possible expense in upkeep of the selection, and whether the liabilities are likely to exceed the assets.

The critic may ask what will be the position if the unforeseen happens and the first year's crop is a failure. However, if one reckons one's returns on the average of past years one cannot go far wrong. Further, does an investment of this type pay? Without hesitation I would say it does, for with a little management and economy any selection should produce a substantial income or at least a progressive income, although times are what we call unsound for profitable wheat growing. Those who survive these hard times are certain to make greater returns in good times. It would be very uneconomical to lay out cash on a farm during a period of land rush, that is to say, at a time when wheat prices soar to £1 per bag and wool and sheep to unbelievable prices. This does occasionally happen, due to various causes, such as war. It would pay the prospective investor to continue share farming until the rush was over, or better still get in before the rush. It is nonsense to say that one is not likely to do such a thing as invest during a land rush, for many were caught during the last, and many will be caught during the next.

Cherry Cultivation.

In an address to members of the Carey's Gully Branch at a meeting held on 13th July, Mr. W. H. Bishop briefly traced the origin and introduction of the cherry into England. He stated that parts of the Carey's Gully district were especially suitable for the production of the finest quality cherries. The most suitable soil was one with 6 to 9 inches of loam with a friable clay subsoil over a slatey foundation, which should be well drained. A hill slope having an eastern aspect was best, giving a maximum of warmth, sunlight, and protection from cold. Small fruit was sometimes caused by cold spring weather and absence of sunshine. Later varieties generally responded to the warm weather and filled out better. For planting, soil should be broken to a depth of approximately 18 inches. Steep slopes were not a disadvantage as they ensured good natural drainage. Such country would have to be hand-worked, being deeply hoed in autumn and lightly hoed in spring. The minimum distance for planting to permit a reasonable development was 25ft. Ploughing among cherries could be done, provided it was carried out from the time of planting. Old trees, previously hand-worked, might be damaged by ploughing because of the breaking of surface roots.

Rhubarb or other crops could be grown between cherries during the first few years, provided they were liberally manured. Bone dust was very suitable for use at planting time. Trees should be pruned during the first 6 or 7 years with the object of building up an open frame of the inverted umbrella type. Leaders should be cut to an even length in order to give balance to the tree, though it was sometimes necessary to cut a strong leader back a little more so that the growth would be even. Later pruning consisted of thinning out when necessary, cutting out cross limbs and any that might be broken during picking. Summer pruning was advisable for trees which had ceased growing, cutting back into 2 or 3 year old wood. When trees had reached the bearing stage they should be manured with 6lbs. of super. per tree in autumn and 6lbs. of nitrate of soda per tree in spring.

Cherry trees in bloom at Blackwood Experimental Orchard

Stable manure was not favoured, as it appeared to encourage fungus diseases. Blood manure and sulphate of ammonia increased crops but produced rather soft fruit, while sulphate of potash made no apparent difference to crops, although it was believed to harden the fruit and thus improve its carrying properties. Nitrate of soda controlled disease more successfully than did sulphate of ammonia; it appeared to retard the development of black aphis.

Black Spot was the worst fungus disease, being particularly bad in colder districts. Treatment consisted of spraying with Bordeaux mixture just before budburst, followed with lime-sulphur spray. Gumming was generally due to lack of drainage and could be cured by cleaning off. Insect diseases included pear or cherry slug, which could be killed by half-strength arsenate of lead spray applied when the fruit commenced to color. Black aphis could be removed by dipping ends of young limbs in a strong kerosene emulsion bath. Nicotine sprays were not recommended; they killed the natural parasites which would otherwise help to control the aphis. Where young trees were affected by Silver Leaf the affected limbs should be cut off and the cuts painted. Old trees should be cut off at the roots.

The two main varieties of cherry stocks in use in Australia were Mazzard and Kentish. The former made bigger and more deeply-rooted trees, but Kentish, while it had a dwarfing tendency, would grow on a wider range of soils and would do well wherever plums could be grown successfully. Grafting gave a better percentage of successes than budding. Scions should be cut early, heeled in until required, and should be kept dormant. Grafting was done when the buds were bursting. Earlier grafting was not likely to be a success. As there was a danger of Silver Leaf in grafting large trees, big cuts should be painted.

Varieties grown locally were Early Lyons, Knight's Black, Tartarian, St. Margaret's, Up-to-date, and Williams' Favourite in dark cherries. The last-named was probably the best. Light cherries generally grown included Bigarreau Twyford, Bigarreau Napoleon, and Florence (locally misnamed Waterloo.)

Cherries should not be picked too early. Black cherries increased in size nearly 100 per cent. from the pink to the black stage. Picking during the heat of the day should be avoided if possible, especially if the fruit was to be exported. It was advisable to allow the cherries to cool overnight in unpapered cases. There was a good local and interstate demand for light cherries for crystalizing and bottling. It was important that fruit sold for that purpose should be sound and of good quality. A good report had been received on cherries sent to Victortorian factories last season. The factories would purchase very large quantities provided the quality continued satisfactory.

Most varieties of cherries needed cross-pollination, and some research on the subject was desirable. Much work had been done in America, but it was of little use in Australia, except to show the value of cross-pollination, as the varieties used in the tests were not known here. It was necessary to grow several varieties together to ensure cross-pollination. Knight's Black would fertilise Tartarian, and Napoleon were suitable to grow among Up-to-date and Williams' Favorite.

Koppio's Thirty-first Annual Report.

The annual meeting of the Koppio Branch was held on 1st July. The Secretary, Mr. M. T. Gardner, read his report, in which he stated that the Koppio Branch had been in existence for 31 years. It was still in a flourishing state and there were noticeable strides in the agricultural development of the district. The data compiled at Roseworthy College and at the Waite Research Institute was disseminated by the Bureau system, and it would be very hard to estimate the value of the Bureau since its inception. The information gained of the scientific development of pastures and of the growing of better and more suitable carcasses of fat lambs had been spread over the State through the medium of the Bureau and members at Koppio had shown that they had done what others told them could be done. Their members had used to advantage the knowledge gained from other members in methods of working mallee land.

Seasons in the district varied a lot. This year had been very disappointing. Last spring was too wet, the summer too wet and cold, and autumn and early winter were too dry. There was, in consequence, a shortage of feed, with losses in sheep and lambs. From lessons of the past, the year had demonstrated the wisdom of conserving fodder, either in the form of better and top-dressed pastures or in stacks of cereal hay or silage, and by no overstocking. The Federal Government subsidy on super had made top-dressing an attractive proposition, and if the subsidy was available for next year, everything should be done to top-dress more land than in the past. The district was not wheat-growing land, but it was good sheep country. The rough scrub land must be farmed for a few years and then sown to pastures and left for grazing after 3 stubble burns.

The Branch had experienced a very successful year with a membership of 21, which was greater than the roll for many years past, and young men were taking an interest in the work Eleven meetings had been held with an average attendance of 12 members and an average of 6 meetings per member. During a crop inspection in November, members had particularly noticed the good growth of subterranean clover, which, if sown extensively, would help to solve fodder shortages in the autumn months. Last season the Denton Trophy was won 20 miles north of Koppio, and the Champion Wheat Crop was grown at Yeelanna, 20 miles north-west. There were 5 Life Members on the roll, who continued to take an active interest in the Branch; these included the first President and the first Secretary.

Coonawarra's Annual Report.

In the course of his report at the Eighth Annual Meeting of the Coonawarra Branch on 11th August the Hon. Secretary (Mr. J. M. Kain) stated:

The Branch is continuing its steady progress, a record average attendance (24.5) having been achieved in the year under review. It is a pleasure to carry on under such conditions, because judging by attendances at some other Branches, officered by competent and enthusiastic men, there must be a great deal of doubt in the minds of many men engaged in agriculture as to the value of the Bureau; and apparently some very successful South-Eastern farmers have come to the conclusion that it is of no use. It is hardly necessary to point out that the primary producer's job is every day becoming a more scientific one, and unless more luck than he deserves follows the unprogressive man, he will, metaphorically speaking, have a harder row to hoe than ever. There is, I understand, an idea in the minds of some men that many of the newer methods advocated by Departmental Officers are not economic, but you will agree that never has an idea been dealt with at our meeting without the question of costs being thoroughly answered. The successful primary producer of the future will have to keep up with his job, and he will have the opportunity of doing this by observation, reading, and lectures and demonstrations. The Bureau is giving its members all these opportunities. The cost of membership is negligible, and the demands made upon members not too onerous. Do not ask yourself the question, "Can I afford the time to go to that meeting to-night?" Rather say, "Can I afford to stay away?"

There are members who are thanking their lucky stars—rather should they thank their own common sense—that they attended the meetings when the making of ensilage was explained, and that they read the Departmental publications on the subject. This is only one of the benefits which have come to them by reason of membership. To the successful man who has not joined up we would say—do so. The Bureau needs him and his successes, just as it needs his more unfortunate colleague with his failures. Experience is the best teacher, and somebody else's experience is the cheapest.

The Bureau in Coonawarra has served many purposes. It has given some form of higher education, particularly in the things that matter most. You have increased your powers of observation. None of us dislike public speaking so much as we used to. Its social features cannot be overlooked, for it has become our club. Above all, I have seen the feelings of good fellowship and sympathy grow; so well exemplified at the working bee in the vineyard of a fellow member just back from hospital. We wish to thank all non-members who assisted; the members—well, we expected it of them.

That we are fortunate in our membership was proved by the instructive local papers given during the year. They were:—"Fruit Marketing," by Mr. Darwent; "Diseases of Sheep," by Mr. Lear; "Experiences in the British Navy," by Mr. Soper; and "Sowing of Pastures," by Mr. McBain. The debate in July was an outstanding meeting, and our new debaters distinguished themselves. We must have more debates. The Question Box evening proved informative.

In conjunction with the Women's Branch, we essayed an Annual Social and Dance last year. It was a social success, and I hope that our second venture will prove equally pleasant.

The Branch has, I trust, not yet reached the zenith of its popularity. The year to come will, I feel sure, be of benefit to members educationally, socially, and financially.

Seeding.

[Paper read by Mr. P. H. WAGNER at the Annual Meeting of the Brimpton Lake Branch on 7th July, 1936.]

The first preparation for seeding is to make sure that all implements are thoroughly overhauled, and that all shares for both plough and combine are in good condition, with a few extra ones on hand in case of breakages or losses. It is essential to have good shares for seeding—the partly worn ones could be used for fallowing when one has the opportunity of working the ground more often. Harrow points should be sharp, and drill tubes in good order.

The beginning of seeding operations depends in this district largely on the time the first rains come, but in an average year, when rain falls about the beginning of May, work the fallows as soon as the weeds appear, which should be 4 or 5 days after the rain. Weeds are much more easily killed when very young. If grassland is to be cropped this should then be ploughed. For grassland shallow ploughing is necessary, and this should be left at least a fornight before harrowing, and a month before sowing.

In sandy soil a drill is to be preferred for seeding, as this does not sow as deeply as the combine, but on heavier soil which is liable to cake, the combine is better. Oats should be the first grain sown, and for this district a good stooling variety such as Algerian is suitable. These stand plenty of moisture. All oats should be seeded by the end of May if posible.

June is the ideal month for sowing grassland, but July sowing has given good results. Where possible the fallow may be left until the end of June or middle of July before sowing.

Care should be taken not to sow any seed too deeply, and the harrows cannot be used too often on sandy country. However, unless seeding is delayed very late, too much harrowing has a tendency to make clay land run together.

Early varieties of wheat for this district are best with a dressing of from 60lbs. to 70lbs. of seed and 1cwt. to 150lbs. of superphosphate. Light dressings of super are false economy. The varieties with which I have had most success are Ford, Nabawa, Late Gluyas and Dan, and for grassland Currawa has been a good late wheat.

So far the methods outlined have been definitely for old land. New lands should be treated differently. It always pays to fallow new land and seed it much earlier than old land. 45lbs. for late wheat to

55lbs. early wheat is a good dressing, with 90lbs. to 100lbs. of super per acre. Where possible a mould-board plough should be used, as it pulls out more stumps, thus clearing the ground more quickly and providing a better seed bed. Where possible a combine should be used, as this implement has a tendency to level the ground. Harrows cannot be used too often in new country, as they bring loose rubbish and roots to the surface thus preventing air pockets which so frequently cause Take-all. Only graded seed should be used, and my experience has been that copper carbonate is the best pickle, but where wheat is smutty, formalin should be used. On no account should bluestone be used, as pickle must be very strong to kill Smut, and bluestone kills from 20 to 30 per cent. of the grain. Strictly speaking smutty wheat should not be used at all.

The Duck as a Commercial Proposition.

[F. R. Johnston, Springton.]

In compiling this paper it is my desire to work more from the national aspect of the matter than from the mere raising, profitably or unprofitably, a few ducks in one's back yard or on the farm as a side-line. Unquestionably duck raising is profitable, and with a little experience anyone can build up quite a respectable flock and at the end of the breeding season show a reasonable profit on the season's operations. Unfortunately we have neglected the duck as an export possibility, but there is no doubt that there is a substantial export trade in this respect going to waste. Before the war several shipments of carcasses were made to London and Hull. The birds arrived in good condition and sold well, but since the war breeders have not been able to keep even the local market fully supplied.

The best known breeds of ducks in this country are the Fawn Runner, White Runner, Khaki Campbell, Pekin, Aylesbury, Rouen and Muscovy. The Runners and Khaki Campbell varieties are merely egg-laying machines. Unfortunately the trade in duck eggs is purely local, and although there is an export possibility from the pulp point of view, this market is already fully supplied from underweight and cracked hen eggs. Another point is that the Chinese hold the bulk of the pulp market in England.

The Pekin and Aylesbury varieties are typical table birds, and a cross of the two breeds results in a good heavy type of duck eminently suitable for export. The flesh is firm and of good flavour and texture.

However, for general all-round suitability there is no bird to compare with the Muscovy which, incidentally, is not a duck in the opinion of many experts, but probably a type of goose. Some years ago I tried the experiment of crossing Muscovies with Pekins and Rouens, but the result was a hybrid which would not breed again.

A breeding pen of seven ducks and the drake will produce in one season, say, from September to May, 300 to 325 ducklings, the market weight of which at the age of 12 weeks, allowing for an equal number of ducks and drakes, would be 2,000lbs. No other bird, and probably no animal, will make flesh at the same rate as a young Muscovy, and drakes will go from 2ozs. at birth to 9½lbs. to 10lbs. at 12 or 13 weeks old. The market price of the birds has varied this season from 6½d. per lb. to 9d. per lb. live weight, with an average of about 7½d. per lb. In the 1935-36 season, with two breeding pens of seven ducks and one drake each, I reared about 425 birds. One of the pens was not started until late in November, so that I did not have a full season with that particular pen. Owing to what is still an unexplained mystery, 102 of my prime birds were poisoned with arsenic at the height of the season. However, I was still able to sell and use about 300 birds at an average net cost of approximately 8d. per lb. live weight. I used about 100 birds for my hotel and these birds were charged on my house accounts at 1s. per lb. dressed, which is somewhat lower than the average price for dressed roasting ducks. The total dressed weight of the birds used in the hotel was approximately 400lbs. or £20 in value. The total money received for all other birds sold was £33 or approximately 3s. 6d. per bird.

I have kept careful costs of feeding and find that the average is from 1½d. to 2d. per bird per week, including labour. Of course, I was compelled to write off the poisoned birds as a total loss, and but for this accident my reason would have been very satisfactory. Earlier in this paper I stated that breeders were not producing enough birds to meet local demands. That is so, and last December dealers were buying hundreds of ducks in the Adelaide markets, transporting them by lorry to Melbourne and making a gross profit of as much as 3s. 6d. to 4s. per bird on the resale. There was no difficulty in securing 3s. 6d. per lb, for a prime dressed drake in Melbourne last Christmas and I have a friend who paid 15s. for a bird at a well-known Adelaide shop on Christmas Eve.

Australia ranks No. 1 in the world as a meat eating nation, but is much lower on the scale when it comes to the consumption of table poultry. Therefore, it is hard for many people to realise the extent to which raising of table poultry is carried out in some other countries, particularly America, China, Japan and the Malay States. In California and Florida there are many duck farms which carry a normal stock of from 10,000 to 12,000 birds, and there is one farm in Florida with a seasonal stock of 250,000 birds. This farm is controlled by a large chain hotel corporation and is the last word in efficiency and management. The Florida farms are situated mostly on the coast and on the banks of creeks. The fairly high rise and fall of the tide cleans the pens and sheds daily, thereby saving an enormous amount of labour.

It has been estimated that the weekly consumption of table poultry by the Negro population of America exceeds 7,000,000 birds. In the Straits Settlements the position is somewhat the same, and I am convinced that there are favourable export possibilities in this direction. It is my intention to send a trial consignment of 50 prime birds to Singapore next season and also one to London or Hull. In a district such as this, duck raising should be extremely profitable, owing to the fact that summer greenfeed is always obtainable and also that the summer season is rather mild. Contrary to the average opinion, the Muscovy does not require a great deal of water. It must have enough to immerse its head and keep its nostrils clear, but the essential thing is a cool, shady spot in the summer.

Almost any article of food properly prepared and marketed will find a buyer overseas, especially if it can be marketed profitably at a price lower than the current price in the importing country. There is no doubt that we can produce a market table poultry at competitive prices, and under proper organisation this branch of the poultry industry should have a good future.

Shearing Operations.

[J. Clothier, Brimpton Lake.]

Good yards can be made with pine posts and rails procurable in the district at a small cost. If they are barked before being erected they will last a long time. A good plan for the yards is to have 2 receiving yards with a gate between them. The yards should be large enough to hold the flock to be drafted. In the corners of the receiving yards, at right angles with the division fence of same, there should be 2 gates leading into a small three-corned yard, and thus into the drafting race, which should only be wide enough for a full-woolled sheep to walk through easily. The race should lead into 2 yards which hold the separate classes of sheep, with gates leading from them back into a yard on either side of the drafting race, thus completing the yards except for the gates. Gates can be made with pine uprights and small pine rails, the uprights being bored with a large auger, and the rails trimmed down to fit the holes. With a double wire running from corner to corner and twitched tight this makes a good gate.

SHEARING SHED.

The shed should have the longest wall running east and west. It should be built of timber and iron or stone, and should have ample light, especially over the shearing board and wool table.

Size of Shed.—1,000 sheep could be handled comfortably in a shed 40ft. x 30ft. The main door should be on the east end, and large enough to get a bale of wool through easily. It should lead to the wool floor, which should be 30ft. x 16ft. thus allowing plenty of space for wool table, presses, bins, &c. The shearing board, 8ft. x 16ft., should be against the north wall adjoining the wool floor, leaving 8ft. of space, which is made into a race by which the sheep enter the shed. The race is made the full width of the shed and along the south wall (24ft.) so as to enable one to fill either of the catching pens, which are 14ft. x 8ft. respectively. The race and catching pens should be grated with gratings which are movable for cleaning-out purposes. The catching pen gates leading on to the shearing board should open in either direction for convenience when carrying out a sheep. A good type of letting-out door is one that can be pulled up and is fairly easy to make. The shorn-sheep pen should be well made, and high enough to prevent sheep from getting out. A good branding race is also a necessity.

SHEARING.

Shearing should commence about the middle of September. A week or so before shearing everything should be put in order. See that you have wool bales, branding oil, bale fasteners, or sewing twine, and some sheep dip ready mixed, but on the weak side, for cuts on sheep; also that there are enough sheep shears, and that the grindstone is in fair condition. If you have a mixed lot of sheep to be shorn it is advisable to draft them into separate classes before shearing as it saves time with the wool classing. If they are dirty they should be crutched before going on to the board, as it helps to keep the wool clean, and therefore improves its value. The sheep to be shorn should be handled carefully, and carried on to the board with one hand under the brisket. If your shears are sharp the sheep can be shorn well without cutting them. They should be trimmed well around the eyes, crutch, and tail. As the wool is shorn off it should be thrown back. This gives the woolpicker a better chance of picking up the fleece and throwing it out well on the wool table with the shorn side down to allow the second cuts to fall off. Then the fleeces should be skirted lightly, and put into separate bins, one branded AA for the long-stapled wool, and one branded A for the short stapled. Having the bins branded saves mistakes. The bins should be large enough to hold a bale of wool, and could be baled with a box press, which makes a neat bale. The bales should average 250lbs., and should be branded neatly.

Slaughtering on the Farm.

[Paper read by Mr. A. R. Steinborner at the July meeting of the Brownlow Branch.]

The cheapest meat that can be had on the farm is that which the farmer rears and slaughters himself; therefore, it is essential that a farmer should be a butcher as well.

The Pig.—The pig should be placed in a clean dry sty a few days prior to killing. The quickest way to kill a pig is to walk up to the sty with a loaded rifle, and while the pig is looking at you put a bullet in the middle of its forehead. As soon as it is down stick a knife into its throat and bleed it. After it is properly bled it is taken out of the sty, placed on planks, and scalded and scraped. After this is done the pig is suspended with the hind legs well apart on the gallows and give it a good wash down with cold water, after which the head is cut off. When gutting commences first make a cut down the middle of the belly and open it about half-way down. The bone between the hind legs is next sawn through, the intestines and all the rest carefully trimmed off, and the belly opened right up, and the whole of the inside pulled out. It is then sawn through from the tail down to the neck, the gallows chain pulled up, and the pig left hanging to cool out.

Cattle.—A bullock is led by a rope to the gallows, tied to one of the posts, and killed in the same way as a pig. After this its throat is cut and bled. It is then rolled on to its back, a log on each side keeping it in position. When skinning it is first cut from the throat along the belly right to the tip of the tail, then along the legs from hoof to hoof. After this is finished one log is moved a little so that it leans one way. First the front leg is cleared, gradually working towards the back part, being careful not to leave any flesh on the skin. Care must also be taken not to make holes in the skin. The other side is treated in the same way. It is not necessary to skin the bullock across the back while it is lying on the ground. After the legs and sides are cleared it is gradually pulled up the gallows, and the skin is pulled from the back as it rises. It is gutted in the same way as a pig.

Sheep.—It is not necessary to shoot a sheep first; just cut its throat and break its neck. This operation is generally done on a wheelbarrow, and the carcass left there until the skinning is finished. The sheep is gutted in the same way as any other animal.

The brains of either a sheep or bullock provide a tasty meal, and are taken out by splitting the head with an axe. The whole head of the pig is cleaned, eyes taken out, nose and ears cut off, and the rest goes into the wurst.

Bulk Handling of Grain.

In an address delivered before a meeting of the Hilltown Branch on 31st July, Mr. A. W. Christian, M.P., said that South Australia had often led the van in agricultural improvement, notable examples being the invention of the stripper and stump jump plough. In advanced methods, too, our farmers had given a lead and established practices that were followed by other States.

On the marketing side, however, we were very much behind other States, and indeed other countries in the world. Thus Turkey, where cultivation was still as it was centuries ago, nevertheless possessed thoroughly up to date bulk handling facilities at her shipping ports. New South Wales was just carrying out her final programme, Western Australia was now adding another 49 country silos, and Victoria had everything ready to commence construction.

Since the abortive effort of 1922, bulk handling in this State had received very little interest and attention. The depression, however, had focussed eyes upon it once more as a means of reducing costs, and its adoption had been strongly advocated by wheatgrower members of Parliament. They had investigated the scheme in all the other States, formulated practical proposals, and commenced negotiations for its establishment.

From the results achieved elsewhere, it seemed clear that the ultimate saving possible was 4d. per bushel, which on a 30,000,000bush. market crop represented £500,000 additional spending power to our farmers.

One of the most important factors under bulk handling, and one which on the best authorities, accounted for at least 1d. out of the additional 4d. mentioned, was the provision that stored wheat remained the property of the grower until he elected to sell his scrip.

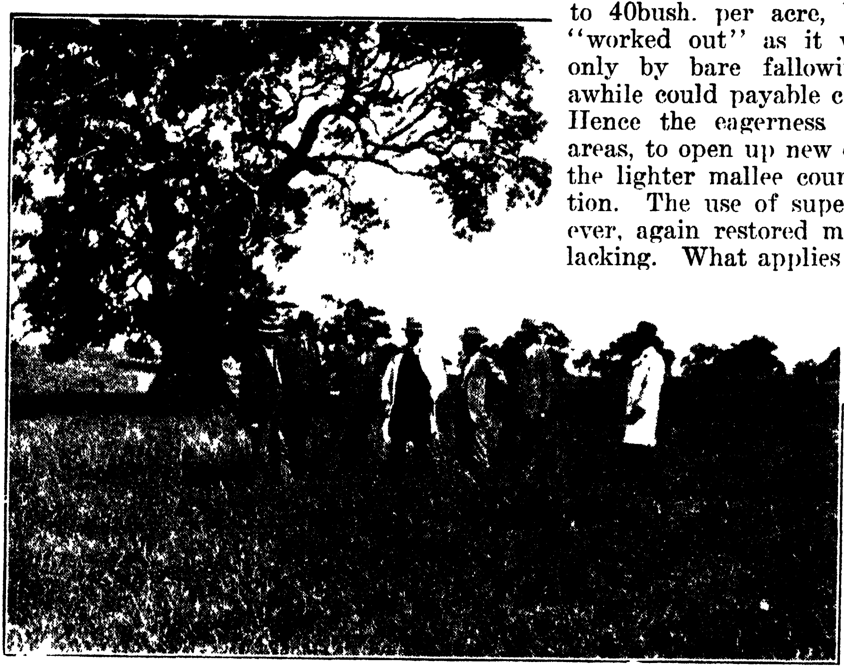
It had sometimes been suggested by interested oppositionists that the many shipping ports in South Australia were a serious obstacle to the establishment of facilities here. Against that, however, it might be pointed out that by reason of our shorter rail haul (our average is 70 miles against New South Wales 300, Victoria 190, and Western Australia 150) we would not require anything like the storage capacity at the seaboard which was necessary in other States. The type of installation most suitable for South Australia would probably be a composite one, i.e., the more orthodox concrete structure in districts where there was little variability in yield, and the unorthodox Western Australian shed storage in our marginal areas.

Farmers to-day experienced no difficulty in handling wheat in bulk from the farm to the siding; they simply used their bags over and over again, any becoming worn out being replaced by each season's super bags.

Improving our Pastures.

In a paper read before a combined meeting of the Saddleworth and Wirrilla Branches on 1st August, Mr. F. Coleman referred to the need for pasture improvement to increase the return from holdings. He stated:—

The Governor-General of New Zealand, Lord Bledisloe, an authority on Grasslands, said in 1934, "If only true herbage plants of leafy character and nutrient composition clothed the New Zealand pastures, and were grazed at that stage which gave most protein and other food output, only half the present area would be necessary to carry the present livestock." No agricultural activity has been so widely or highly developed in New Zealand as its pastures, and yet, according to Lord Bledisloe, they could be made twice as good. What, then, shall we say of *South Australian pastures*, on which very little *if anything* has been done at all? Surely there is abundant room for improvement of our pastures.



Phalaris tuberosa at Eden Valley.

Our research institutes and experimental plots are doing good service; but to get the full value of their research and experiments there is need for extensive putting into actual practice of the information supplied by our research officials. How are we to set about the job?

Fertilisers are necessary in order to replace the mineral matter taken out of the soil by the crop or pasture and removed from the farm in the form of meat, butterfat, wool, &c. Our South Australian soils are deficient in phosphates, hence the wonderful response from the application of a little superphosphate. Our early cultivated areas 90 years ago yielded crops up to 40bush. per acre, but they became "worked out" as it was termed, and only by bare fallowing and spelling awhile could payable crops be obtained. Hence the eagerness to take up new areas, to open up new country, or bring the lighter mallee country into cultivation. The use of superphosphate, however, again restored much of what was lacking. What applies to wheatgrowing and to cereal crops is also true of grass and of pastures generally. Manuring improves the palatability of the grazing; and the use of artificial fertilisers for the pastures, coupled with judicious grazing, is superior to cutting the grasses with a mowing machine as a means of improving the pastures. The running of animals over the pastures contributes quite appreciably to the improvement of the latter by frequent and close grazing, together with the rapid return of manurial ingredients, thus helping in the rate of circulation of plant food through plant and animal. The excreta left by stock, if in adequate numbers, is sufficient to supply the nitrogen in most instances, but the use of phosphates will reach their maximum return when the nitrogen demands of the grass sward are fully met. *Nitrogenous manures* are expensive to apply. Nitrate of soda and sulphate of ammonia are the forms in which this fertiliser are usually obtained, and their application undoubtedly adds to the yield of herbage; but if by judicious ingrazing by stock a balanced ration for the herbage is obtained, this is less expensive than the application of commercial nitrogenous fertilisers. As a rule there seems little need to fear a shortage of *potash,* but *lime* is needed, more so than most of us realise We must consider the amount of lime constantly being absorbed by the animals for all purposes—for the framework of all growing stock, for the milk supply of lambing ewes and milch cattle —all this has to come from the soil. It must be available in the soil for the plant to absorb it, and then the stock in its turn to use it for building up the framework of the animal itself, or for its calf or lamb, and to form an important part of the composition of its milk; the health of our livestock, too, is very dependent on lime, and its greater use even as a lick would no doubt lessen certain weaknesses such as milk fever in cows. It is much better to feed the crop with lime when needed than to apply lime to a feeding ration direct to the stock, though phosphate and lime may be so applied with advantage to dairy cattle as sterilised bone meal for example.

Wimmera Rye Grass and Subterranean Clover

As it is easier to maintain livestock in good condition when once they are in good order than it is to build them up when allowed to become very poor, so in respect to pastures it is better to keep the pasture in good condition by small and inexpensive annual top dressings than to try and build it up at long intervals when the land is exhausted of fertility; the main constituents of mineral products removed by the livestock naturally should be considered in replacing such loss by top dressing.

Our pastures are naturally very poor in appearance compared with those in England or New Zealand, or under irrigation, as at Wood's Point. Yet the quality of some of our native grasses is of a very high order. Broadly speaking, probably our indigenous grasses might be expected to persist better than imported ones. Our *Danthonias*—there are a few varieties of these "Wallaby grasses" that are found almost all over the State—are probably our best grasses. Two varieties now growing on Tuela are quite good. They are *Danthonia semi-annularis* and *D. Duttoniana.* These are fine-leaved tussocky grasses, about 1ft. in height; they are termed White-top or Fluffy-top. They are perennial, providing feed during the greater part of the year, the best winter grasses standing feeding off in the coldest weather; this winter growth is rather uncommon with our native grasses. In summer they die off, but revive again in a wonderful manner with rain. The fluffy light seed probably has helped to spread these grasses so widely, as the seed is easily carried by the wind. The value of the *Danthonia* grasses has been well proved by pastoralists; along the coastal districts of New South Wales horses and cattle fatten quickly, and the best sheep in that State are raised on the *Danthonia* grasses alone. It responds to irrigation well, and in New Zealand is recommended both for very dry and very wet soils.

Wimmera Rye Grass has gained considerable attention during the past few years on account of the rapid and bulky crop it has yielded during the first year's growth on newly-grassed land. This grass is closely related to an Italian strain of rye grass. It is an annual grass, but seeds so heavily that if not cultivated up to a considerable extent it comes up so thick as to choke itself out, and a weak, poor plant or stand results. Perennial Rye Grass is the most popular cultivated grass in the temperate regions of the world, and Wimmera Rye Grass owes its value to its resemblance to its noted relative. A mixture of Wimmera Rye Grass with a clover has proved satisfactory, and *Subterranean Clover* introduced into Mount Barker district some 40 years ago fully justified its use. Seed from Mount Barker tried in several paddocks on Tuela proved to be of no practical value; it did not seed early enough. Later an earlier strain of Subterranean Clover from Dwalganup, Western Australia, however, set its seed so early in the spring that it was able to bury its seed in the soft soil, and this has been quite a success, a really good stand of this clover being obtained. Being a legume this clover collects those nitrogen-producing bacteria in the roots nodules of the plant, thus helping to enrich the soil with bacteria and nitrogen. An important admixture of a clover is essential in every pasture stand, and this strain of early Subterranean Clover seems to meet the case.

Phalaris is one of the most drought-resisting grasses I have known. Plants of it lived through the 1914 drought, and there are plants still alive that were growing in 1913-14. *Phalaris tuberosa* has a reputation for winter growing and feeding value in the winter and spring. Its value later is of no account until the autumn, when it responds to the early rains of April and May. On our black Bay of Biscay heavy clays, liable to crack in summer time, this *Phalaris* will resist all droughts better than other grasses.

African-Veldt-Grass shows drought resistance but does not appear to provide enough bulk. *Kikuyu* and *Rhodes* need summer rains.

Mediterranean Grass, or Kelch Grass. While at Orroroo a fortnight ago my attention was drawn to this grass growing in the street at Orroroo. The chief point in its favour is that it is displacing barley grass and thus will mean an increase in the stock carrying capacity of our mallee farms.

POINTS ON PASTURES.

1. Of *Australia's overseas exports* 60 per cent. in monetary value is derived from her grass lands. Hence more economic production is national gain.

2. Wide variation in plant form exists in all species, considerable improvement can be effected in the standard of our pastures.

3. *Wimmera Rye Grass* with *Subterranena Clover* have proved satisfactory, giving bulky return the first year, is easy to establish, unless fed very bare indeed the rye grass will re-seed.

4. The *Danthonias* will exert a big influence in our sheep production.

5. The *Clovers* not only increase the fertility of the soil, they also improve the growth of the grasses, and texture of the soil.

6. *Phalaris* is a high drought resister and gives early winter and spring feed, especially on our black heavy clays.

7. The *botanical composition* of the pasture may be changed by judicious grazing, thus conserving the better quality grasses.

8. Find out the most *suitable species* of plant for the purpose you have in view, meat, milk, wool, butterfat, early lambs or whatever you are aiming at, then by fertilisers and grazing aim to dominate the sward with such plants, and so increase your returns per acre.

9. Having developed your grasslands or pastures see that you put on *stock* worthy of the feed you are providing, culling your sheep, herd-testing your dairy cattle, keeping a good class of pig that is in demand, If kept with cattle, in due proportion, pigs will return an extra 1½d. to 2d. per lb. to your butterfat returns; at least so say our New Zealand friends, who ought to know, though we can top off with grain cheaper than they can.

10. *Finally, do not be afraid to produce* as economically as you can, there is no over-production of food. There may be faulty means of distribution. In May, 1934, butter in London was 9d. a lb. and 10d. Danish, it was 1s. a lb. in Copenhagen, 1s. 11d. in Brussels, 2s. in Amsterdam, 2s. 6d. in Berlin, and 3s. per lb. in Paris

Activities of Women's Branches

AUBURN.

The annual meeting was held on 20th August. Mrs. Kench presided over an attendance of 27 members and visitors. Officers were elected and a programme of meetings arranged for the ensuing 12 months. Miss E. Campbell, of the Education Department, spoke on "Balanced Diets." (Secretary, Miss L. Dennison.)

BALHANNAH.

Mrs. Norsworthy occupied the chair at the meeting held on 19th August, at which 22 members were present. One new member was proposed. Members discussed matters in connection with the Branch's exhibit at the Royal Show. (Secretary, Miss P. Grow.)

BALUMBAH.

In the absence of the president, Mrs. A. Swann presided. A combined meeting with the Men's Branch was held to discuss the agenda of the Annual Congress. (Secretary, Miss H. Jericho.)

BEETALOO VALLEY.

Eleven members attended the meeting on 27th July. Miss Ryan read a paper on "Soap Making" and Mrs. Pearce spoke on "The Salmon Industry." (Secretary, Miss L. Pearce.)

CLARE.

A "Lend-a-Hand" afternoon was the nature of the meeting held on 1st August, which was attended by 32 members and visitors. A pair of boy's trousers to be reseated was brought along and a member capable of doing this work showed how it should be done. Various styles of grafting in connection with knitting was shown to those desirous of knowing how this should be done. (Secretary, Mrs. A. Pollock.)

DEVLIN'S POUND.

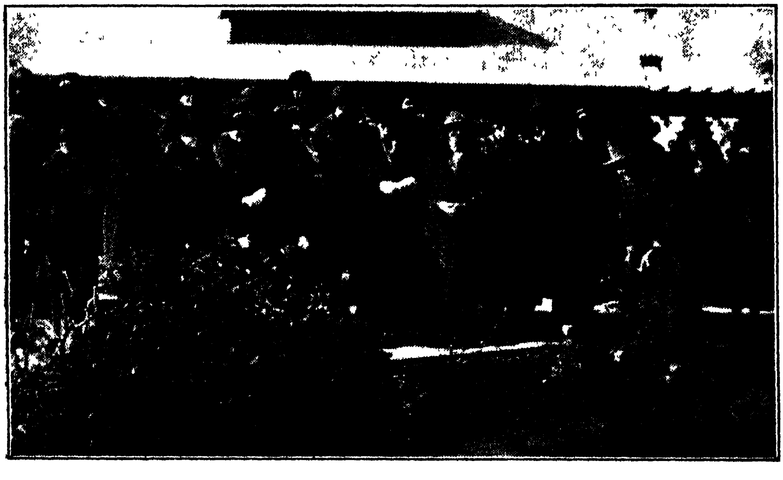
"The Parent, the Teacher and the Child" was the subject of a paper read by Mr. R. Treloar at the meeting held on 15th July. Owing to very rough weather the attendance was small. (Secretary, Mrs. I. Loffler.)

ECHUNGA.

Mrs. La Vars gave a demonstration of cutting and fitting a frock at the meeting held on 19th August, which was attended by 19 members and visitors. Three new members were enrolled. (Secretary, Mrs. F. Dennis.)

GEORGETOWN.

Before an attendance of 27 members and five visitors, Mrs. Prior, of the Gladstone Branch, read a paper, "Puddings," which aroused an interesting discussion. (Secretary, Miss J. Crawford.)



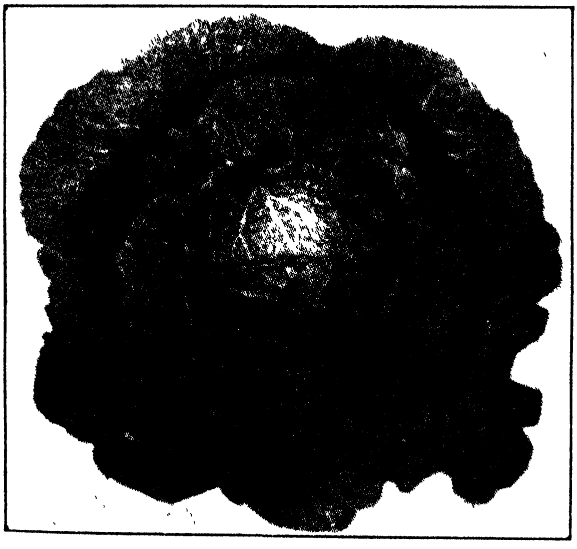
Mr H. H. Orchard demonstrates Rose Pruning to members of the Strathalbyn Women's Branch.

HOPE FOREST.

At the meeting held on 6th August, which was attended by 17 members and the Secretary (Miss M. DeCaux), Mrs. E. Petersen gave a talk on "Geese." She said best results would be obtained from three-year old birds. While a younger goose might lay more eggs, it was likely to desert the nest before hatching time. The first brood should be timed to hatch about September, when the young birds would do very well on fresh green feed. In 10 weeks the birds should be ready for market and at that age should weigh about 12lbs. Free access to water was essential and, if available, boiled rabbits could be added to their ration. Wheat, Mrs. Petersen thought, was better for geese than barley.

KARTE.

Mrs. Trowbridge presided over an attendance of 22 members and visitors. Two new members were proposed. Misses G Fiebig and D. Trowbridge reported on the Pinnaroo Conference. Mrs. A. Mattschoss read a paper on "Sausage Making" and exhibited a sample of each recipe. (Secretary, Mrs. F. Atze.)



Savoy Cabbage.

Toulouse Goose

KOOLUNGA.

The meeting held on 20th August was attended by 33 members and visitors. Instrumental and vocal items preceded the formal business. Speaking on "The Preservation of Vegetables," Mrs. Perrin said that green vegetables could be kept fresh by placing in an air tight receptacle; lettuce, cabbage, celery and green onions especially lent themselves to this form of storage. Root vegetables which in some districts could be purchased only occasionally could be placed in the ground and if kept damp could be used as required. All roots should be boiled slowly in boiling salted water with the lid on the cooking vessel. Potatoes were the exception and should be put in cold water. Green vegetables, except peas, should be cooked quickly in salted water. Salt should be added to the water in the proportion of one teaspoon to one quart of water. A pinch of carb. soda could be added to green vegetables, but it lessened the dietetic value of the article. Green peas could be improved by adding one teaspoon of sugar and a sprig of mint to the water. Steaming was another excellent method of preparing vegetables because the goodness was not thrown out with the water. When making gravy, the water in which vegetables had been boiled could be added. To remove the odour and strong flavour of onions, it was a good plan to peel and place them for five minutes in a bowl of boiling water in which half teaspoon of carb. soda has been dissolved. Spinach should be cooked in very little water to which one could add with advantage butter, pepper and salt. Mrs. Perrin recommended cooking pumpkins and vegetables of a like nature in their own juice. A teaspoon of butter could be placed in the saucepan and pepper and salt used as a flavouring. Simmer slowly, but do not allow to burn. When ready for use, cream all together and serve. Carrots should be sliced thinly with one teaspoon of butter and finely minced onion. Cover tightly and simmer until tender. Add just a trace of nutmeg and pepper before serving. All steamed vegetables should be moistened with melted butter and flavoured to taste. Mrs. Powell also read a paper on "Vegetables." (Secretary, Mrs. C. Buchanan.)

LAURA BAY.

The August meeting of the Branch was held at the residence of Mrs. W. Bowell, 11 members being present. A programme of meetings for the ensuing year was drawn up, delegates elected for Congress and the agenda discussed. (Secretary, Miss R. Blumson).

MONARTO SOUTH.

At the meeting held on 15th August, Mrs. H. White presided over an attendance of 17 members and 10 visitors. Miss S. Schenscher read a paper, "Notions for Knitting." At this year's Murray Bridge Show, an exhibit will be staged by this Branch. Four new members were enrolled. (Secretary, Mrs. F. Liebelt.)

MUDAMUCKLA.

Twelve members attended the August meeting. "Common Ailments of Children" was the subject of an instructive address given by Sister Norton. (Secretary, Mrs. A. L. Kuhlmann.)

MYPONGA.

The meeting of 13th August took the form of a social afternoon, 15 members and visitors being present, at Mrs. W. Lykke's homestead. Mrs. C. Martin spoke on her experiences in the Far North. (Secretary, Mrs. M. Bounds.)

NELSHABY.

Mrs. H. Noll read a paper on "Gardening" at the July meeting, which was attended by 19 members and visitors. The paper read as follows:—There is nothing more delightful than a beautiful flower garden where one can fill in many a leisure hour attending to the wants of plant life. It is also very useful to have a few flowers growing; these brighten up the home when attractively arranged. On the other hand, a vegetable garden is a necessity in every home, as fresh vegetables are for more appetising than those which are usually bought from shops.

GENERAL REQUIREMENTS.

Suitable Soils and how to Improve Them.

The best soil is a deep, light, friable loam, but any ordinary soil can be made into a good garden with ordinary care and attention. Very heavy land should be dressed with air-slacked lime, and a good dressing of ashes, old mortar or sand may also be applied with advantage. Continual dressings of stable manure tend to lighten a clay soil and make it more easily workable. Care should be taken not to work this kind of soil in a wet condition, and whenever any portion of the garden is likely to remain vacant for any length of time (either winter or summer) it is a good plan to roughly dig it and leave it in lumps exposed to wind and rain. This will soon mellow the clay and make the soil friable and easy to work, more especially if it has had a good dressing of manure each year. Worked out land will also be greatly benefited by having a green manure crop dug in.

Watering and Irrigation.

It does more harm than good to be always sprinkling the surface. When

watering, it is most important that the ground should be thoroughly soaked. If this is done every one or two weeks it is preferable to lighter and more frequent applications. The roots of plants will then be encouraged to go deep down into the soil instead of being merely on the surface and will be out of the way of the hot sun and drying winds. The best method is to run the water into prepared drills or shallow trenches, letting it gradually soak in.

Mulching.

In hot, dry climates it is advisable in late spring, say, before hot weather sets in, to cover all beds with a good dressing of well rotted manure, grass cuttings, leaf mould or any other substance sufficiently open to let the water through and yet keep the land moist and cool. Land so treated will not require half the labour in watering and plants will thrive much better. When summer is over the litter should be dug in and will act as an excellent manure.

Manuring.

Well-grown vegetables or flowers cannot be grown successfully without using plenty of manure. Ordinarily there is nothing to equal well-rotted stable manure, but where this is not obtainable, artificial fertilisers form a very good substitute. The best way to use the latter is in conjunction with rotted weeds, animal refuse rotted into a compost.

Compost Heap.

Every garden should have a compost heap where garden refuse can be put to rot. Leaves, weeds, straw and grass clippings, &c., can be collected into a heap. When rotted it should be spread over the land used for renovating flower beds or mixed with sand and loam in equal proportions for growing seedlings, pot plants, etc. Once tried, no one who values the pleasure of having a vigorous growing crop will care to be without a compost heap.

Hoeing and Weeding.

An old adage says, "One year's seeding makes seven years' weeding." If the opportunity is taken to hoe between the rows during hot, dry weather, there should not be much trouble from weeds in a small garden, but they require constant attention, and often through a few days' neglect in early spring and autumn, weeds get beyond control and cause endless trouble. The hoe should be kept constantly going, not only to kill the weeds, but also to conserve the moisture, and even in dry districts with a low rainfall successful gardening may be carried on by using these "dry farming" methods.

GENERAL ARRANGEMENT.

The best aspect for a vegetable garden is a gentle slope towards the north-east, with a shelter of some sort as a windbreak on the southern and western boundaries. Much protection may be afforded by a framework of wires interlaced with ti-tree, and if thought unsightly, many creepers which are useful and profitable may be used to cover it up, such as roses, sweet peas, beans, cucumbers, &c. These will not rob the ground as much as permanent shelter of shrubs and large trees.

ROTATION OF CROPS.

To get the best results in a vegetable garden, it is most necessary that different kinds of crops follow each other. Under no circumstances should cabbage follow cauliflower, or carrots succeed parsnips. Each crop should be as dissimilar as possible from its predecessor. A spindle-rooted crop should succeed a fibrous-rooted crop or *vice versa*. Carrots, parsnips or beets should never be grown on freshly manured land or they will grow mis-shapen or forky. Cauliflowers, cabbages and others of the same family require plenty of manure as they are heavy feeders. If the garden is systematically worked in rotation and regularly fertilised, good results should be obtained.

A GARDEN CALENDAR.

Beans.—Sow in late spring and early summer when the ground is warm and frosts abated. Provide plenty of water.

Beet.—Deep, rich, well-drained land which has been well manured for a preceding crop is best suited.

Cabbage is one of the most important vegetables. They do best in highly manured and deeply trenched soils.

Cauliflowers require much more care, richer soil and better cultivation than cabbage. They are weak growers from the seedbed onwards.

Carrots.—Land heavily manured the preceding season for a green crop or fallow land which has been deeply dug. Sow in spring and early summer.

Lettuce.—With care in their cultivation these may be sown at any season of the year when the weather is mild.

Onions do best in a rich, adhesive loamy soil; light or sandy soils should be made as firm as possible.

Peas.—Almost any good soils will grow these. Sow every few weeks during winter for a continuous supply.

Potatoes.—These should be planted for early use as soon as the frosts are over in good, deep, well-manured soil.

Turnips to be tender and well-flavoured must be grown quickly, consequently should have a rich soil and an open situation.

FLOWER GARDEN—GENERAL REQUIREMENTS.

An ornamental garden should be divided into walks and lawns and beds. There is room for individuality in garden designs, and the house and surroundings should reflect the tastes and ideas of the owner. Some people prefer a stiff formal garden, the flower beds planted out in regular designs such as carpet bedding, ribbon borders, &c. This style has of recent years given place to a much freer and more individualistic treatment. In laying out a garden natural features should be taken advantage of as much as possible. Before commencing actual work, a scale plan of the proposed design should be drawn out.

Ranunculus and Anemone.—These lovely spring-flowering, bulbous plants are all comparatively easy to grow and should be planted out in April and May for best results.

Antirrhinums are one of the showiest of flowers for sunny borders. They are continually in bloom and thrive even in the driest and hottest situations.

Asters.—These revel in rich soil. They should never be allowed to suffer from drought. The bed should be mulched and sprinkled every few days. Being a soft surface rooting plant they soon suffer from want of moisture.

Delphiniums.—There is no flower in the garden more beautiful than a mass of delphiniums. The colours are so uncommon and harmonious. The richest shades of blue and purple contrast finely with other garden flowers.

Pansies and Violas.—These are two of the oldest garden flowers and the most popular. They may be planted to form a border or dotted about here and there in any mixed bed of flowers. Soil must be rich and light.

Salvia.—For a blaze of colour throughout summer nothing can equal the Scarlet Salvia. These should be grown in the open.

Stocks.—These flowers make a gorgeous display in spring. A sunny, airy position and a well-drained, free soil are essential.

Sweet Peas.—The Spencer varieties are the best to grow, as these produce a wonderful range of colour. Any free, open, well-drained soil will suit Sweet Peas. (Secretary, Miss A. Lawrie.)

PENOLA.

Twenty-six members attended the annual meeting which was held on 5th August. Officers were elected for the coming year. Mr. W. H. Downes judged the Butter

Making Competition conducted under the auspices of the Branch and made the following awards:—First, Mrs. R. Ricketts; second, Mrs. Oswald; third, Misses R. Hill and A. Marks. (Secretary, Mrs. Edith Kidman.)

PINBONG.

The annual meeting was held on 25th July and was attended by 10 members and visitors. Officers were elected and Mrs. Guidera gave a paper on "The Care of Children. (Secretary, Miss D. M. Scholz.)

PYGERY.

The meeting held on 4th August took the form of a Cooking Display, entries being made by Mesdames Heath, Duggin, Woodrup, and Miss Woodrup. (Secretary, Miss E. Woodrup.)

RENDELSHAM.

Mrs. Smith read an instructive paper, "Fernery and Rockeries," at the meeting of the Branch held on 26th August, which was attended by 10 members.

SADDLEWORTH.

The August meeting was in the hands of members from the Auburn Branch, who made a very attractive display of home made rugs. The visitors also gave a demonstration of rugmaking. (Secretary, Miss G. Frost.)

SHEOAK LOG.

Mrs. S. Bowden presided over an excellent attendance, 39 members and several visitors being present. Officers of the Branch and Congress delegates were elected. Recipes were discussed and samples of the biscuits made therefrom were exhibited. It is pleasing to report that there are 48 active members on the roll. (Secretary, Miss K. Koch.)

TAPLAN.

Mrs. Fogden presided over the meeting held on 20th July, which was attended by 10 members and several visitors. Miss E. Campbell, of the Education Department, spoke on "Dressmaking." A further meeting was held on the 30th of the month. Shrubs for the garden and breadmaking recipes were the items introduced for discussion. (Secretary, Mrs. P. Hodge.)

WASLEYS.

The meeting of 6th August, at which there were present 35 members, was devoted to a Cookery Competition. There were 30 entries in the eight sections and prizes were won by the following:—Six pastries, Mrs. Wilson; six savouries, Mrs. Wilson; six scones, Mrs. R. George; six small cakes, Mrs. Wilson; light sponge, Mrs. H. G. Hancock; dark sponge, Mrs. J. Hancock; decorated sponge, Mrs. R. George; block cake, Mrs. R. George. This competition ended the series of three and Mrs. J. Hancock has the highest aggregate with 316½ points and Mrs. Wilson is runner-up with 302 points. Both will receive trophies, one donated by Mr. F. Gilbert, of Roseworthy College, and the other by Mr. R. Sarre, of Adelaide. (Secretary, Miss K. Harding.)

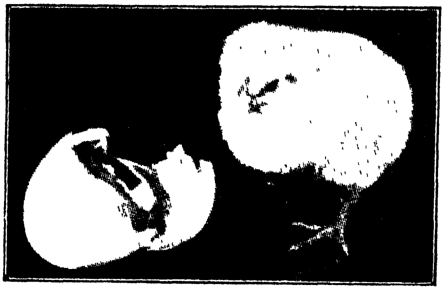
WIRRABARA.

Mrs. Watt occupied the chair at the August meeting, which was attended by 26 members and 10 visitors. Mrs. Jaeschke exhibited wholemeal bread, tea buns, yeast and doughnuts, and gave recipes for same, also recipe for yeast. Mrs. Watts displayed bread and tea buns and explained her method of making same. Mesdames Raftery and McKenzie exhibited loaves of bread. Several other members submitted their recipes for making yeast and methods of breadmaking. Pastry was exhibited by the following members:—Mesdames C. Hollitt, Phillis, and Harding, who explained their methods and recipes. Considerable interest was manifested by all members and Mrs. Jaeschke explained the method of making barley coffee. (Secretary, Mrs. E. Harding.)

WILMINGTON.

At the meeting held on 13th August Mrs. Christophersen gave a report of the Eurelia Conference. The Marmalade Competition was won by Mrs. Harrison. Ten entries were received for the Vermicelli Making Competition, Mrs. W. Noll being adjudged the winner. Two new members were enrolled. Miss F. Modystach read a paper on "Dressmaking."

Mrs. H. Carter read a paper, "Incubation of Chickens." She said the hatching of chickens is very interesting, although it requires a lot of patience. The first thing to do is to set the incubator level and where there is no vibration, see that the thermometer and capsule are reliable; it is always advisable to keep a spare one of each in case of accidents.

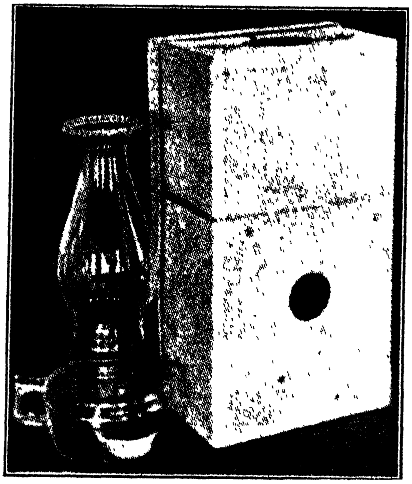


Never set eggs that weigh under 2ozs. Any with rough shells and weak spots should be rejected. They must not be more than a week old: to find out hold them up to a strong light and if fresh the air space will be no bigger than a sixpence. If too old, too much moisture has evaporated out of them, which causes chicks to die in the shells or they are late in hatching and chicks are weak. If eggs are procured elsewhere they should be stood with big end up for 24 hours to give them time to settle.

Moisture is important and the water tray must not be allowed to get dry; some machines have no water tray, but wet sponges can be used. Heat the incubator and run temperature at 102 degrees for at least 24 hours to thoroughly heat it and to adjust regulator. Having had the machine running at an even temperature for some time the eggs may be placed in and hatch started. Cant them at an angle of 45 degrees to allow room to get the full number in. The temperature will drop and will take some hours to come up again. Care should be taken not to let the heat rise too quickly. Once the correct heat has been attained—102 degrees with bulb of thermometer resting on eggs—they are not to be touched, except to reverse the tray night and morning, for 48 hours. After this period the eggs should be turned every 12 hours. When turning, move the eggs about in the tray as much as possible for the first week. Turning must be done quickly and the eggs replaced as soon as possible.

TESTING THE EGGS.

After the hatch has been going for seven days, the eggs can be tested for fertility. This can be done by having a piece of cardboard 1ft. square with a hole the shape of an egg cut out in the centre, by holding the cardboard up to a strong light and putting the egg to the hole. The infertile will be quite clear, while the one with a live embryo will be cloudy down one side, and will also show fine lines resembling a spider's webb. These are the blood vessels forming from the albuminous portion of the egg. Both the clear eggs and those which show a heavy ring across the centre without the finer lines must be rejected. The central portion from which the vessels radiate is the heart and even after one week, if the egg has a white shell, it can be seen pulsating. Brown-shelled eggs do not show up so easily as those with a white shell, so they should be tested more carefully.



A Good Egg Tester.

A kerosene lamp set inside of a shoe box, with a hole opposite the lamp flame, makes a good egg tester.

After the first week of incubation, the temperature will have a tendency to rise above the height at which it stood during the first week; this is caused by the gradual heat generated by the growing embryos. Care must be taken to keep the flame a little lower as the hatch goes on. After the seventh day, the eggs can be left out of the machine for a longer period to allow them to cool off; the proper time to replace eggs is when they are just warm to the touch. Cooling is best done in the morning; in the evening the eggs should be turned and replaced in the incubator.

After the fourteenth day, the eggs can be tested again, those with live chicks in them will be opaque over a large portion of them; any that are clear or with black spots or rings in them should be discarded. During the last week the temperature will have a tendency to rise more, and a low flame on the lamp will be all that is necessary, turning and cooling are to continue, but the eggs will be much hotter to the touch, owing to the chicks coming to maturity and creating their own heat, taking them longer to cool down. They can be left out for half an hour or more, depending on the temperature of the incubator room. The temperature can be allowed to rise slowly up to 103 degrees towards the end of the last week, but not over, as the eggs will be overheated if allowed to do so. On the morning of the nineteenth day eggs must be turned and the machine closed up and not opened again until the end of twenty-first day unless it is absolutely necessary, as the rush of cold air upsets the moisture in the egg tray, causing the chicks to stick to the shells before they have properly broken them.

If the hatch has run right, the eggs should be chipped towards the end of the twentieth day, and any that are not hatched by the end of the twenty-first day are usually weaklings and die after a week or two. Never turn eggs after filling the lamps, as kerosene often gets on the hands. Kerosene is injurious to the eggs.

OTHER MEETINGS.

Owen.—Paper on "Bread Making" by Mrs. Helps at meeting held on 13th August.

Strathalbyn.—Address by Miss E. Campbell, "Balanced Diets," on 13th August. Present, 25 members and 31 visitors.

Tantanoola.—Meeting held 5th August. Present, 11 members and a large number of visitors. Demonstration of pruning by Mr. A. L. Warren.

Wirrilla.—12th August. Annual meeting and election of officers.

Yandiah.—14th August. Present, 15 members and 11 visitors. Annual meeting and election of officers.

Yurgo.—Homestead meeting held at Mrs. N. Easton's residence on 23rd August.

Papers Read at Forty-Seventh Annual Congress

City versus Country Life.

[Mrs. J. Foggo, O'Loughlin.]

The city is the centre and mainspring of most of the goings and comings of those living in the suburbs, and though city life proper is altogether different from suburban life, yet we of the suburbs glean much from an educational point of view as well as pleasure. In voicing my experience of city life, it is only natural if I appear to show more leaning towards it, having lived most of my life in the suburbs. From childhood we are surrounded by so much, and we do not begin to realise just how much until we are uprooted from it and begin to live a totally different life in many aspects. From childhood too, there is a wider outlook in the surroundings and observations of school life, though perhaps much is missed in not living so near to nature as our country brothers and sisters do, but I believe much more of that is taught nowa-days.

Then there comes the time when we have to venture out into the world and find our own sphere in it. To anyone with ambition, no matter in what road of life it leads, there is always a spirit of adventure attached to our first venture on the road. Life is full of ups and downs, no matter where it is lived, but the knowledge gained and used to the best advantage always leads upwards on the road to success, and as most of our waking hours are spent in the city learning to the best of our ability, it is not only in the workroom or office, or wherever it may be, that our education ceases, but in the using of our eyes and ears to our outside surroundings.

Then there is also the comradeship of fellow-workers, and friendships that perhaps carry on through years. All this I consider an advantage over what the country has to offer; by the "country" I do not mean the townships, as my experiences have led me away from them. Of pleasures there is a larger variety to choose from, be they good or indifferent. One learns to use discretion in their choice, and what better than to have spent an occasional night of gaiety away from the humdrum of everyday life. It tends to lift us out of what otherwise might become a rut. Even taking a walk through the city streets will lift our thoughts out of ourselves. I like, too, suburban life with its electricity and its different appliances that help to simplify everyday work, besides all the other conveniences there are at hand. One misses them in the country, though there are compensations, such as plenty of firewood, eggs, butter and meat all produced on the farm, making a living in these articles cheaper. However, the costs of other commodities in comparison with city prices is greater.

Even though one can adapt oneself to environment, there is a longing for social intercourse which I have found sadly lacking. Perhaps the fault or faults lie somewhat in being situated so far outback, abnormal times and lack of an easy mode of travelling. These do not give one the usual chance of becoming acquainted with country life as it was lived in normal and better times. To the shy newcomer, one finds it hard to re-adapt their ideals and mode of living, and is perhaps misjudged through not being able to do so from the first, and the hospitality of the country is to a certain exent withheld. Closer settlement which I have previously experienced, did not prepare me for what was in store in a more scattered community, and perhaps it was not to be wondered at, when disillusionment quickly followed. Yet there is always much of interest in the country, with its changing seasons and different aspects of beauty, especially the glorious sunsets, the growing and ripening grain, etc., and so much learned by living closer to nature, and the peace and quietness of the bush, though occasionally one may long for some of the bustle of the city for a change.

The installation of wireless has certainly made us feel we have more in common with the cities, and keeps us in closer touch with the worlds happenings and gives a wider outlook in general.

Fancy Work.

[Miss Audrey Marks, Penola.]

Good needlework has a fascination all its own, and its uses are so many and types so varied, that it is a most pleasant and interesting, besides useful pastime.

To the learner, the more simple stitches are best and with careful blending of colours and good finish, even Lazy Daisy and Stem Stitch can be made most effective.

Such wonderful improvements have been made of late with colours and quality of threads, that the present-day needleworker has means at her disposal to create wonderful pictures with almost the same effect as an oil painting.

If one is fond of pictures and disinclined to attempt colour blending, effective little pictures very like an etching can be made with Stem Stitch. To advance to more elaborate work there are Richelieu, Cut Work, and Hedebo. Each has its own distinctive feature.

Richelieu Work.

Richelieu holds pride of place in white work and, carefully executed, is a most beautiful type of work. It is interesting to note that it was called after Cardinal Richelieu, who commissioned needleworkers to imitate in cut linen the handsome design of the wonderful and costly Venetian needlepoint laces, thus creating a new type of embroidery.

It should be remembered that in Richelieu the tiny bars should be worked first and the addition of picots on them is an improvement. A running stitch should outline the whole design. Most modern designs of Richelieu include some Satin

Stitch which should be heavily padded to form a contrast.

Cleanliness in white work is absolutely essential—for exhibition it must never be washed, though steeping in borax and water is permissible, and then press under a damp cloth, always remembering to press on the wrong side. Some advocate pressing on a thick towel, but personal experience has taught me to use a thick blanket covered with a piece of old linen and another piece wrung out in water and then laid over the back of the work and ironed until dry. On no account put the iron on the right side of the linen.

Threads must never be carried across the back of the work, and knots will be penalised by judges. Threads can be carried across the back for Seed Stitch only.

Hedebo and Coloured Work.

Hedebo is a very old type of stitchery and must be evenly worked—it is really beyond a learner. One cannot easily purchase designs and it is one of the few forms of work that is more effective in coarse thread and linen. Well done, the work is very beautiful, but it definitely needs a lot of patience.

With coloured work it is difficult to know where to start; such wonderful natural effects in shading are possible and to those who are interested, study light and shade as in painting if it is desired to be successful. Long and Short Satin Stitch are the most suitable stitches. These are sometimes mistakenly—according to old authorities on needlework—called Indian Filling, but is really opus plumarium. For conventional coloured work such as Jacobean embroidery, which is being revived at present, one needs an extensive knowledge of fancy stitches and here again colours must be carefully chosen. To all who undertake blending of colours, one cannot do better than say, "Study Nature."

Soaps and Cleansers.

[MRS. J. M. PENGILLY, Wilmington.]

For the beginner, these few remarks will correct some common errors.

Caustic Soda.

Do not be afraid of caustic soda; most of us know that soap is produced by saponifying oils and fats with alkali.

Our grandmothers boiled together washing soda, lime, and sometimes ashes to produce a lye with which to make their soap. To-day we buy lye in handy tins, ready to be boiled with the other ingredients. The labour involved is thus halved.

Requests are often made for a soap recipe without caustic soda. This may be because the inquirer cannot procure the caustic, but is probably from some beginner, who fears the caustic will be too severe on her hands and clothes. This fear is unfounded. Soap cannot be made without the use of caustic soda, and the prepared caustic is used because it is handy, cheap, and efficient. In advertisements, it is sometimes stated that certain brands of soap are free from caustic soda. Well, it can be said just as safely, that good home-made soap, correctly made, is just as free from caustic.

The soda, fats, etc., have been changed into soap by being properly blended; the different ingredients restrain each other, so that there is sufficient cleansing properties, without being destructive to either fabrics or skin.

About antiseptics: a soap that could be called antiseptic would certainly be harmful to both skin and fabrics. Disease and germs thrive in dirt, and if the dirt is removed there is seldom need of disinfectants and antiseptics. Soap is an ideal cleanser.

Recipes.

Soap: Put into a copper 2galls. of rain water, 1lb. of good caustic soda, 1lb. of resin, 6½lbs. of good fat, free from salt. Boil half an hour, then add 1 packet of lux and ¼lb. of borax. Stir well, boil half an hour longer, then put fire out. Add 1 cup of kerosene, 1oz. rock ammonia. Stir now and then until it starts to thicken, then put into tins. Leave for a month before cutting up. Some use 1 tablespoon of glauber salts and others 1 cup of sugar to stop shrinkage, but even the bought soap shrinks a little when it has been left long enough.

Sand Soap: There are several useful articles that can be made out of the above pulp; here are a few:—One cup of soap pulp, 1 cup of sifted wood ashes, 1 cup of washed sand, ½oz. of rock ammonia or ½ cup of cloudy ammonia. Mix well and pour into mustard tins.

Hand Cleanser: Two cups of pulp, 1 cup of kerosene, 1qt. of boiling water, 1oz. of washing soda, ½ teaspoon of eucalyptus. Mix well and pour into tins.

Cleansers: (1) 1lb. of hot pulp, 1 tin of Old Dutch, 1qt. of boiling water. Stir well and put into tins. Old caustic or treacle tins are good (2) Mix together 4lbs. of clean sand, 4lbs. of whiting, 1 packet of soap extract. Fill into empty tins with close-fitting lids. When wanted for use, put a few holes in the lid.

Carbolic Soap: Take 4lbs. of soap pulp and put over heat until melted. When nearly boiling, remove and add ¼pt. of carbolic liquid and ½pt. of glycerine, mix together quickly, then put into moulds to set.

Cleanser for Washing: 2lbs. of washing soda, 2lbs. of new lime, ½lb. of borax, and 3galls. of rain water. Let stand for three days, strain through a muslin, and bottle. This must be put into enamel or earthenware container. Use ½pt. to each copper of clothes with the usual quantity of soap, bring to the boil, and put dry clothes in and boil 15mins.

Candles: Melt together 10ozs. of mutton tallow, ¼oz. of camphor, 4ozs. of beeswax, and 2ozs. of alum. Dip wick in a solution of 2ozs. of saltpetre and ½lb. of lime to 1gall. of water. This is to prevent the tallow from running and to improve the light.

Butter-making in Small Quantities.

[MRS. W. VARCOE, Millicent.]

One of the first essentials to good butter making is cleanliness. When milking, first wash the cows' teats and udder with warm water, then dry with a clean, soft piece of old rag. Be sure the hands are clean, as well as the milking vessel. Milk bucket, strainer, separator, and any utensil used for milk, cream or butter, when dirty should first be washed with clean, cold water, then in warm soapy water, and finished off by being immersed in or scalded out with boiling water. It is always best to cleanse them as soon as possible after use.

When separating, have the milk a little warmer than when it is first drawn from the cow. Run about ½gall. of boiling water through the separator before puting in the milk. This warms the machine, and there is no loss of cream by the first of the milk being put through too cold. If the milk is separated when it is overheated, good butter cannot be made from the cream.

Never mix freshly separated cream with cream from the last separating. Stand it aside, first stirring it with a wooden spoon or ladle. Then when it is cold, mix the two lots together and set away to ripen. Stir it a few times—twice, or even three times a day, never less than twice a day, and it will then ripen evenly.

It is far better to churn a small quantity of butter twice a week than to allow the cream to become over-ripe, and as a result, have badly flavoured butter. In cold weather, cream ripens slowly, so instead of mixing two separatings together, mix three or four days cream to make one churning.

Ripening the Cream.

It is often rather difficult to get cream to ripen in winter, so make, a culture by putting a pint of freshly milked warm milk in a small jug with a piece of clean muslin covering the jug to keep out dust, and set it in a warm place near the kitchen fire for two or three days,. until it has thickened and turned sour. Then 24 hours before churning, slightly warm the cream and stir in the sour milk, leaving it stand in a warm place for 12 hours, and then another 12 hours in a cold place.

Instead of making a culture, if the previous lot of cream has ripened well, save a pint of buttermilk, keep it in a cool place away from any odours that may taint it, and use it to ripen the next lot of cream. Be sure with either the culture or buttermilk that it is not tainted. It should be just very sour, not at all cheesy flavoured.

Milk and cream should never be kept in a room or dairy where anything else is stored, the odour of any produce with a strong flavour will taint it, and it is then impossible to make good butter.

Making the Butter.

When only a very small quantity of butter is to be made, a large basin is useful to churn it in, using a wooden spoon for the purpose. Whether using a basin for a small lot or wooden churn for a large quantity, first scald the utensils with boiling water, pour that out, and quickly rinse with cold water, the colder the better. Then put in the cream and churn until it forms small grains. As soon as these are about half the size of a pea, pour in a little cold water, first having poured off as much buttermilk as possible and continue churning until the butter is one large lump.

Pour off the buttermilk and water. Scald and rinse a dish and butter pats. Put the butter in the dish, wash and work it well in three or four waters until the water comes off quite clear. Then sprinkle salt over the butter and work it in. Taste, and if not salty enough, add a little more. If too salt, wash in cold water again until the flavour is right. When weighing see that the pounds are heavy ones, for weighed exactly to the 1lb., by the time it is made up it will be a lightweight pound.

Scald and cool the butter boards and pats in cold water. Place the butter on the wet board and work and pat it into shape with the wet wooden pats. Never touch it with the hands, as this breaks the grain and makes the butter greasy.

Sheepskin Tanning and Washing.

[Miss I. Todd, Coonalpyn.]

Tanning the Skins.

On most farms where numbers of sheep are handled, there are often odd pelts or pieces of wool lying around that are difficult to turn into cash, but they can be made into many useful and comforting articles. There are two types of articles that can be made, one in which the wool detached from the skin is used and the other where the skin is tanned and used with the wool on the leather. For mats and door slips the skin with longer wool is very effective. Short wool is much better for smaller articles, but can be clipped to the desired length.

The scouring of the wool and tanning of the skin is proceeded with at the same time. Remove as much fat and tissue as possible from the flesh side of the skin with a blunt knife. This saves a considerable amount of energy later on, as the skin must be free from all these scraps when finished. If the wool on the skin is very dirty and contains a high percentage of yolk, it is advisable to soak it in bran water for 24 hours, using 1 quart of bran to 4galls. of water. It is not necessary to strain the bran water before immersing the skin, or to rinse the skin before proceeding with the tanning.

Have at hand about 9 quarts of bran, 3lbs. of alum, 2lbs. of salt, 1lb. of saltpetre, 1½lbs. of good household soap and plenty of water. Melt 1½lbs. of alum, 1lb. of salt, ½lb. of saltpetre, and 12ozs. of soap in hot water, add to this 2 quarts of bran and sufficient cold water to cover the skins. Stir well to get the bran mixed. Then soak the skins in this liquid for 24 hours. Work the skin several times while it is soaking. Lift out and squeeze out as much water as possible. Dissolve the remaining 12ozs. of soap and add 2 quarts of bran with sufficient cold water to cover the skin. Soak the skin, working it as much as possible for another 24 hours. Lift out and rinse all the soapy and greasy water out well. If the wool is still sticky with yolk, wash it again in very hot soap suds and rinse well. Now dissolve 1lb. of alum and 1lb. of salt and add sufficient cold water to cover the skin. Allow the skin to remain in this solution for another 24 hours. Remove the skin and squeeze out as much water as possible, then place over a fence to drain. When nearly dry, rub into the back of the skin a mixture of ½lb. of alum and ½lb. of saltpetre well powdered. Then rub the skin with a piece of brick to remove any lose fibres and also to soften the leather. After this stage the leather must be soft and pliable. The wool can be combed.

To Cut out the Articles.

With a pencil draw the outline of the desired articles on the leather side of the skin, then with an old razor blade cut the skin along the lines, and when the pieces are separated, the wool will easily part. To join the pieces together, place the edges together and top sew with a strong thread. Do not take a very small stitch, as the edges of the skin will easily tear. Tanned sheepskins can be made into useful furniture dusters, mats, inner shoe soles, animal toys, floor and boot polishers.

Dried Fruits.

[Mrs. R. Jarvis, Warcowie.]

During summer months it is advisable to preserve and dry as much fruit as possible for use during winter. Dried fruits are a great standby, and can be dried with very little trouble and hardly any cost, as there are no expensive utensils necessary. I had great success with my fruits this year by using sulphur fumes and brine made from salt, which I prefer to caustic soda, when there are small children toddling around. Peaches, apricots, and pears were done with sulphur fumes. As there was not an airtight box obtainable, I used a 100gall. water tank. This held a half-case of fruit nicely, a layer on the bottom, cut side up. A tobacco tin half-full of sulphur was placed in the centre and ignited with a live coal. Then the tank was covered with the lid and with a bag to keep the fumes in. It was left for four hours.

Care must be taken when putting the fruit on a wire stretcher, as the fumes make it very soft and juicy. Apples and plums were done in brine made of 2 tablespoons of salt to 1gall. of water. Apples can be dipped in cold or hot brine, but for plums it must be boiling. The brine was made in a copper and brought to the boil. The plums were put in a colander and dipped in and out quickly until tiny cracks appeared all over the fruit. It was then tipped on to a stretcher and placed in an airy place, but not a sunny one, for the first day. On the second day they were put out in the open for about five days, or until there was no juice seen when squeezed.

The apples were peeled, cored (with a clothes peg), cut into rings, and threaded on a string and dipped in cold salt brine. Then the string was suspended between two trees and was left until the apples were tough. Figs can also be done successfully with cold salt brine.

Half a case of fresh fruit costs 3s. 6d., and weighed 22lbs., and when dried weighed 10lbs. Although the fruit loses a lot of weight, one still shows a good profit and it regains the weight after soaking again before use.

How to Nurse and Health.

[Mrs. M. Reynolds, Narridy.]

To know something of how to do simple things for the sick is a duty that rests upon every man or woman. By nature, woman is more adapted to nursing than is a man. What I am going to read has been proved by personal experience which is the best practical training, and is only to be gained in the sick room.

One who expects to succeed as a nurse should be strong, in good health, self-possessed, gentle, sympathetic, neat, quiet and ready to learn and profit by every mistake. Move quickly and quietly, do not bump against the chairs or slam doors. Study the patient's dispositions and know when to talk and when to remain silent; very sick people would rather not be talked to. Also avoid talking about other serious cases. Those near the sick should always be hopeful and full of cheer.

It is the duty of a nurse to see that the room is cheerful, neat, and in order, and properly ventilated, and to see that the bed is made, that the sheets and bed are fresh and clean and kept smooth, to see to the patient's toilet and to the preparation of food, even to the feeding, if necessary. A feeding cup is very handy if the patient is helpless or weak. A bed pan is very essential in a sick room. Always protect the bed with a piece of rubber sheeting. If this is not available, a few layers of clean newspaper will prevent the bed from being soiled.

Temperature.

One who attends the sick should have a fever thermometer and understand how to use it. Before taking a temperature, see that the mercury is shaken right down. The normal temperature is 98.6 degrees. Temperature may be taken by the mouth, by placing the thermometer under the lip of the tongue, the lips being closed, but do not take the temperature if the patient has just had a hot or cold drink, wait for at least 15 minutes. For a temperature taken by the mouth, leave it in position for 3 minutes. Temperature may be taken well up under the armpit, also in the groin, which takes about five minutes.

It is not wise to tell the patient his rate of temperature or pulse. The nurse should not show that she is worried with the patient's condition. If she shows any sign of anxiety this will upset the patient and probably the temperature may rise and make the pulse beat much faster.

It is best to be quite calm and not show any concern in any change, that may develop. If a patient is running a temperature this is far more favourable than a patient very ill and not running a temperature. The former indicates that the body is fighting, of course that is in cases where the temperature can be controlled. There are cases when patients are so ill that temperatures are quite uncontrollable.

The Pulse.

In taking the pulse, use the middle finger and thumb of right hand—the third finger being the most sensitive—and place above the wrist on the thumb side The normal pulse rate is about 70 to the minute; in children it is more rapid, and as the temperature rises, so does the pulse beat faster To count the respiration, the rising of the chest in a minute normally is about 18. Do not (as a rule) awaken a patient out of a sleep to take temperature, or to give food, medicine or treatment, unless the patient is being disturbed by deliriousness. Never allow the patient to have cold feet.

Infectious Cases.

Always disinfect the hands after coming in contact with the patient Always be gentle and firm, especially in giving treatment that the patient may not like.

When the patient is under the directions of a doctor, the nurse should follow out the treatment that he suggests and no other. When the doctor has confidence in a nurse he may give her a great deal of freedom in treating the patient. In emergency, she should do the best she knows until the doctor arrives. A wise person can do much to help the doctor at times. A nurse should always try to anticipate the wants of a patient; straighten the pillow, arrange the covers, smooth the sheet, help the patient to a new position, get a drink. In many ways a patient can be made comfortable.

These little kindnesses given in a cheerful manner will leave a lasting impression. The nurse should be wise enough to see the needs of a patient and should keep a record of the pulse, temperature, respiration, etc., food, medicine and any unfavourable signs.

Health.

Health is the most valuable blessing that any person can possess, and knowledge sufficient to understand the human body organs that is so wonderfully made, and to maintain it in health is far more important than a knowledge of all arts. When health comes to be regarded in this light, the study of physiology will be more fascinating than a story It is a study of vital interest, we are living in a progressive age, and the time has passed when the knowledge of how to care for the body can be retained by a few.

There is a growing demand for popular literature on the subject of health. Every mother should possess sufficient knowledge of the common diseases and their treatment, in order to be able to care for the members of the family under ordinary conditions

A healthy nervous system in the first place depends on healthy blood and healthy circulation Every nerve cell depends upon pure, wholesome food, pure air, sunshine, pure water and active organs—such as the skin, kidneys, and bowels. Under the most favourable conditions, enough poison is produced in a normal person in 8 hours to destroy it. It requires, therefore, food of the highest and best quality to nourish it properly, and to rebuild the waste that takes place from wear and tear. Such a food will be found among cereals, vegetables, nuts and fruits. The process of digestion is a slow one, therefore, food should not be taken into the stomach with great haste; drinking with meals is a very bad habit. Food should be retained in the mouth until it is thoroughly masticated. Poorly cooked foods, hastily eaten, overtax the powers of the stomach, intestines and liver, and as a consequence, consume much nerve force that ought to be stored up in the muscles and nerve cells for future service

Nothing restores nerve cells like sleep. During sleep all the vital processes are slower. Breathing is slower, the body is laying in a supply of oxygen and storing up energy for the morrow. Sleep is the greatest restorative power of the body, a new born baby sleeps most of the time. A child under 2 years requires 12 to 16 hours sleep; a growing boy or girl at least 10 hours, and an adult 8 hours. The aged require less sleep, for all the vital processes are slower.

Any new line of thought is due to the fact that the new brain cells have to be trained. It is difficult for the first time to drive through a wood, the second time easier, and so it is difficult for a new thought to make a pathway and so on until it becomes a habit. It is, therefore, of the utmost importance, that the expressions and methods of thinking should be correct from the first, especially in young children.

Pig Market in Great Britain.

The Commonwealth Chief Veterinary Officer in London (Mr. H. R. Tinney) states in a report to the Department of Commerce (dated 18th August):—"It is difficult to dissociate imports of overseas frozen porkers, and particularly baconers, from the imports of cured bacon and hams. So far as bacon and ham imports are concerned, the Bacon (Import Regulations) Order 1933 prohibits the importation of these products into the United Kingdom except under licence, from the following countries; Argentina, Denmark, Esthonia, Finland, Latvia, Lithuania, Netherlands, Poland, Sweden, U.S.A. and U.S.S.R. Also under an amended order of January 1936, other foreign countries, which previously were allowed to forward up to 400cwts. per week without coming under the 1933 order, had that maximum reduced to 225cwts. per week or 9/16ths of the 1934 or 1935 imports (whichever is the greater).

The main Empire sources of cured bacon and hams are Canada and the Irish Free State. Under the Canadian agreement free entry for imports of bacon and hams into the United Kingdom was granted up to a maximum of 2,500,000cwts. The 1935 total from Canada, however, was 1,095,000cwts. and the total from the Irish Free State was 458,000cwts., which latter figure is expected to be 10 per cent. higher in the current year. These two sources supplied approximately 20 per cent. of the total imports of these products, and of the balance from foreign countries, Denmark, under the Danish agreement, may supply 62 per cent.

The estimated quantities of pork for curing purposes from New Zealand and Australia for 1936 are 350,000cwts. and 130,000cwts. respectively. As regards fresh pork, there are no exact figures available, but it appears that the home producer supplies approximately 5,000,000cwts. per annum, and that this represents a very large proportion of the fresh pork consumed.

Supplies from the Irish Free State have declined from 383,000cwts. on 1931 to 143,000cwts. in 1935, though this amount has probably been rather more than replaced by increases from Australia and New Zealand.

However, it appears that expansion in the porker trade must be somewhat limited unless at the expense of the home producer, and this contingency does not seem a likely one at the moment when for many reasons, including defence, the building up of home supplies is a definite policy.

As far as baconer supplies are concerned, the chances of expansion under present conditions should be greater, as such an increase of Dominions supplies would be at the expense of foreign sources, and it is suggested that the long range view would be to keep the objective of a first grade baconer type always in mind. But should the present policy be abandoned in favour of a duty on unlimited imported foreign supplies, as is suggested in some quarters, this latter contention would possibly not be of much value, and undue optimism in regard to the expansion of the pork export trade would not be justified.

JOURNAL
OF THE
Department of Agriculture
OF
South Australia

VOL. XL. OCTOBER, 1936 No. 3

Published Monthly by the Department of Agriculture Edited by H. C PRITCHARD

Page
Forty-Seventh Annual Congress of the Agricultural Bureau .. 213-221
The Citrus Industry of America 222-236
Some Aspects in the Management of Pigs 237-250
The Importance of the Export of Wine to South Australia .. 251-257
Is Pea Growing Profitable on the Farm? 258
Forty-Seventh Annual Congress Resolutions 259
Tobacco Industry 260-263
Feeding Tests at Parafield Poultry Station 263
Spray Plant and Materials 264-269
Egg-Laying Competitions 270-271
Turretfield Seed Wheat Farm Harvest Report, 1935-36 272-276
Tests of Quality Adapted to Hand-Ground Meals 277-289
Royal Show—Bureau Section Won by Balhannah 289-290
Rainfall Table 291-292
Bureau Reports 293-299

WOMEN'S BRANCHES.

Bureau Reports 299-306

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"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1936

Eyre's Peninsula (Lower), at Yeelanna, Wednesday, 21st October (Mr. R. R. Wilson).

Eyre's Peninsula (Central), at Minnipa, Friday, 23rd October (Mr. H. E. Broad).

Fruit (non-irrigated), at Greenock, Tuesday, 3rd November (Mr. A. Schubert, Greenock).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Tailem Bend, Saturday, 17th October.
Paruna (Brown's Well), Saturday, 17th October.
Maitland, Wednesday, 21st October.
Pinnaroo, Wednesday, 21st October.
Mount Gambier, Wednesday and Thursday, 21st and 22nd October.
Willunga, Thursday, 22nd October.
Clare, Saturday, 24th October.
Kingston (South-East), Saturday, 24th October.
Port Elliot, Saturday, 24th October.
Minlaton (Central Yorke Peninsula), Wednesday, 28th October.
Tatiara (Bordertown), Wednesday and Thursday, 28th and 29th October.
Yankalilla, Saturday, 31st October.
Millicent, Saturday, 31st October.
Naracoorte Show, Wednesday, 4th November.
Kingscote, Kangaroo Island, Thursday, 5th November.
Mount Barker, Saturday, 7th November.
Woodside, Saturday, 14th November.
Kalangadoo, Saturday, 14th November.
Onkaparinga, Saturday, 14th November.

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Agricultural Bureau of South Australia

Forty-Seventh Annual Congress

OPENING CEREMONY

HIS EXCELLENCY'S ADDRESS

Praise for Board of Agriculture: Optimism for Future

After having officially opened the Congress in the Way Hall on 7th September, His Excellency the Governor (Sir Winston Dugan, K.C.M.G., C.B., D.S.O.), in an unexpected second speech delivered after he had risen to leave the hall and with every person in the hall standing, gave an added stimulus to the work of the Congress by praising the Advisory Board of Agriculture and the Bureau.

He also gave an optimistic message to the large assemblage of delegates from all parts of South Australia and to farmers throughout the State.

Before the Governor rose to leave the hall, the Chairman of the Advisory Board (Hon. A. L. McEwin, M.L.C.), who was Chairman of the Congress, had just completed a report on the work of the Bureau during the past 12 months.

''I congratulate Mr. McEwin on his report, which demonstrated clearly to me that the Advisory Board is at the service of the farmers of the State and is always ready to give all the advice and help it can,'' said the Governor. ''I think that here in South Australia you are particularly fortunate in having at your disposal the advice and efficient service of this Board and the Agricultural Bureau. I hope that you, as practical men, will take advantage of the work of the men who study the scientific processes of agriculture, and prosper accordingly. In this Centenary year I think South Australia has advanced considerably, and I want to congratulate you on the advances you have made, and to wish you every success and happiness in the future.''

In declaring the Congress open, His Excellency said it was the third occasion on which he had opened the Congress. On the first occasion, he had been here only a short time and knew little of the agricultural conditions of the State. Since then he had travelled about 40,000 miles in the State, and had seen it from north to south, and from east to west. He knew the conditions under which the men on the land were labouring. At the Show he had been very much interested in the museum of agricultural implements, and he advised all those present to visit the museum. He hoped that the Congress would be a successful one.

At the instance of Mr. J. Wallace Sandford, seconded by Mr. A. J. Cooke, a vote of thanks was accorded His Excellency for his opening address.

With an attendance of 404 delegates and a large number of visitors, and the fact that the attendances were sustained through all the sessions, the 1936 Congress must be regarded as one of the most successful that has been held for many years. In addition to His Excellency's address, speeches were also given by the Hons. A. P. Blesing, M.L.C. (Minister of Agriculture), and A. L. McEwin, M.L.C. A travel talk on England, illustrated with moving pictures, was given by Mr. P. Moody (Managing Director of Lenroc Ltd.).

On Tuesday morning the following papers were read and discussed:—"Some Aspects in the Management of Pigs," Mr. R. Baker (Superintendent of Dairying, Roseworthy Agricultural College); "Is Pea Growing on the Farm Profitable?" Mr. W. F. Wurst (Laura); and "The Citrus Industry of the United States of America," Mr. F. H. Metters (Waikerie). In the afternoon Mr. G. H. Clarke, B.Sc., Botanist at the Waite Research Institute, spoke on Noxious Weeds and illustrated his address with lantern slides. Mr. B. W. Bagenal (Manager of the Emu Wine Co., Pty. Ltd.) addressed Congress on the subject, "The importance of Wine Export to South Australia." The evening session was occupied with an address illustrated with lantern views. "Our Arid Regions," by Dr. C. T. Madigan, D.Sc. (Lecturer in Geology and Minerology at the Adelaide University).

Wednesday morning was devoted to Free Parliament and the evening to an address, "The Agriculture of New Zealand," illustrated with lantern slides and moving pictures, by Mr. R. C. Scott (Chief Agricultural Instructor).

On Thursday morning, delegates, under the guidance of Dr. A. E. V. Richardson and officers of the staff inspected the Waite Research Institute, and afterwards Mr. A. R. Hilton showed the party over the Urrbrae Agricultural High School.

DELEGATES.

The following Branches appointed delegates, and the figures indicate the number of sessions for which attendances of delegates were recorded:—Adelaide—J. Y. Hudd (2), J. R. Hewland (1); Alawoona—T. B. Flint (4), G. A. Thompson (5); Allandale East—C. C. Griffin (5), T. A. Earl jun. (5); Arthurton—D. H. Noble (3), P. Ford (3); Balaklava—G. A. Whiting (3); Balhannah—H. F. Rollbusch (5), R. W. Miller (4); Balumbah—N. A. Jericho (6); Barmera—C. McRae (3); Barootа—W. A. McDougall (4); Beetaloo Valley—T. Jones (3), H. Sanders (3); Belvidere—J. Vivian (4), J. W. Collett (4); Berri—E. J. R. Johnson (6), W. R. Lewis (3); Blackheath—R. S. Talbot (5); Black Rock—W. Cozens (3), R. E. Kitto (4); Black Springs—J. M. Howard (6), B. Heinrich (6); Blackwood—J. A. Lambert (6); Blewett Springs—R. Guthrie (3), C. Gregory (3); Block E—L. H. Laffer (3), Rob. Fisher (3); Blyth—H. A. Zweck (3), K. D. Zweck (3); Booborowie—R. G. Mayfield (4); Booleroo Centre—T. H. Borgas (4); Boors Plains—Wm. Harris (5), H. K. Queale (5); Borrika—R. G. Bonython (4), J. H. Gray (4); Brimpton Lake—V. Dodd (4); Brinkley—J. E. Schenscher (4); Buchanan—W. E. Hansen (3), W. G. Hucks (3); Bundaleer Springs—W. D. Cooper (5), M. J. Cronin (2); Bute—R. W. Langman (2); Butler—E. F. Patterden (5); Cambrai—J. Miller (5), R. Hutton (5); Chandada—R. J. Evans (6), E. G. Voumard (6); Chapman's Bore—B. Wohlfeil (4), E. Buller (4); Cherry Gardens—H. Jacobs (1); Chilpuddie Rock—F. Herde (2), H. Cochrane (6); Clarendon—T. B. Brooks (1); Collie—M. J. Anderson (3), E. P.

Anderson (4); Coomandook—F. E. Ballard (5), W. R. Trestrail (4); Coonalpyn—C. C. George (4), C. L. George (5); Coonawarra—E. L. Gaffney (6), Wm. Davis (6); Cungena—M. J. Bennie (4), C. L. Ayliffe (4); Devlin's Pound—H. A. Loffler (4), J. Chesey (4); Dudley—L. A. Longbottom (3), A. G. Telfer (4); Echunga—A. W. Cobbledick (3), F. H. Wickham (4); Eurelia—C. I. Phillis (3), J. Y. Robertson (3); Frayville—H. B. Scheer (1); Gawler River—F. Wormald (2), E. W. L. Dawkins (1); Gladstone—H. M. Wehr (5), J. Stevens (3); Goode—J. Bagshaw (4), C. H. Linke (5); Green Patch—A. Whillas (5), C. B. Pope (5); Hanson—W. J. Woollacott (4), J. Brereton (5); Hartley—W. J. Brook (3), A. B. Brook (3); Hilltown—M. Kimber (4), L. J. Ashton (5); Kalangadoo—C. E. Leeder (3), R. G. Messenger (5); Karte—D. J. Small (5), G. L. Hatcher (4); Kelly—R. G. Hall (4); Ki Ki—C. D. Barton (6), R. C. Cooley (4); Kilkerran—C. Rechner (3); Koolunga—A. Buchanan (4), H. Spencer (5); Koonunga—F. H. Schulz (4), H. Mibus (5); Koppio—F. Whittaker (6), E. Wait (6); Kyancutta—F. E. B. Daniel (5), E. A. Kelly (3); Kybybolite—D. Chapple (5), D. Schinckel (3); Lameroo—W. J. Morcom (4); Laura—W. F. Wurst (3), V. L. Pech (3); Laura Bay—E. D. Barnett (3), W. W. Barnett (3); Light's Pass—C. A. Verrall (6), F. W. Boehm (5); Lipson—C. M. Octoman (3); Lobethal—E. A. McHugh (1), P. Kerber (3); Lone Pine—E. Hentschke (1); Lyndoch—E. W. Evans (4), E. C. Filsell (3); Maltee—E. Schwarz (4), R. B. Edson (5); Mangalo—L. G. Hanneman (4), G. F. Munday (4); Marama—A. Rogers (5), T. C. Hinkley (6); McLaren Flat—W. H. Kyloh (5); McGillivray—J. N. Wood (2); Millicent—L. C. Hutchesson (6), C. E. Hutchesson (5); Miltalie—J. P. Story (5), R. Jacobs (3); Minnipa—G. Williams (4), S. C. Billinghurst (4); Monarto South—H. B. White (3), H. A. Hein (6); Morchard—J. L. Nottle (5), H. G. Kupke (3); Mount Barker—H. Hunt (1); Mount Bryan—J. L. Connors (4), H. Griffin (3); Mount Gambier—W. L. Barrows (5), E. W. Tollner (6); Mount Hope—G. A. Vigar (3), R. L. Myers (3); Mount Pleasant—W. K. Johns (2), L. F. Rolland (2); Mudamuckla—E. L. Miller (5), W. J. Reinke (6); Mundalla—H. Dinning (3); Murray Bridge—A. Wells (3), A. C. K. Beviss (6); Murraytown—N. F. Scholz (3), E. B. Pitman (4); Nantawarra—G. Henderson (3), L. S. Belling (3); Narridy—E. W. Richards (5), J. Klingner (5); Nelshaby—J. A. Lawrie (5), E. H. Williams (5); Nunjikompita—S. R. Morgan (3), P. Luestner (4); Nunkeri—E. R. Peltz (3), B. Harding (3); O'Loughlin—J. Foggo (6), E. E. Lutz (5); Owen—A. W. Helps (4), A. N. Freebairn (3); Palabie—R. Mullan (3), S. H. Rashleigh (5); Parilla—J. W. D. Carman (4), B. C. Pearce (3); Parilla Well—M. S. Davis (4), W. H. Simpson (3); Parrakie—F. Nicholls (1), H. Cabot (3); Paskeville—R. S. Bussenschutt (4), M. E. Bussenschutt (3); Penola—A. J. Ricketts (4), F. W. Hinze (4); Penwortham—P. Modystach (6); Petina—W. L. Schultz (2), A. E. Daniels (6); Pinbong—H. C. Scholz (5), E. C. Kammermann (5); Pinkawillinie—J. B. Hudson (5), W. G. Miller (3); Pinnaroo—C. H. B. Ross (6), H. Badman (6); Port Elliot—John Colebatch (4); Pygery—R. Woodrup (5), A. Day (6); Redhill—H. J. Crouch (5), L. Harris (5); Roberts and Verran—C. M. Masters (6), A. T. Cowley (6); Rosedale—W. E. Georg (4); Roseworthy—C. Brooks (2); Saddleworth—R. E. J. Miller (1); Shoal Bay—Geo. Barrett (6), W. T. Turner (1); Snowtown—A. R. C. Hocking (5), W. L. Atkinson (3); South Kilkerran—S. W. A. Heinrich (1); Stockport—F. O. Watts (3); Strathalbyn—C. M. Hudd (4), Reg. Sissons (4); Sutherlands—A. M. Twartz (5); Tantanoola—L. R. Anness (3), J. P. Burchard (5); Taplan—W. J. Hammond (5), D. R. Hampel (5); Taragoro—A. A. Edwards (4), A. F. Crabb (4); Tatiara—F. Densley (6), L. H. Butler (5); Ungarra—W. G. Gordon (5), F. D. Butler (4); Upper Wakefield—C. McDougall (2), P. Cleary (1); Waikerie—F. B. Harden (3); Wallala—C. F. Zippel (5), D. Coxon (6); Wandearah—E. T. Sinclair (4), L. A. Jacobs (4); Warcowie—A. F. Crossman (5), E. C. Jarvis (4); Warramboo—P. E. C. Daniel (3), A. Collins (3); Watervale—J. W. Baillie (4); Weavers—E. H. Giles (4); Wepowie—E. C. Roocke (5); Whitwarta—E. S. Manley (4), C. W. Dunow

(3); Williamstown—E. Gottwald (3), W. R. Parmenter (5); Willowie—R. I. Crisp (4), R. A. Barrie (4); Wilmington—E. B. Heyne (5), P. C. Cole (5); Wirrabara—H. C. Jaeschke (4), P. Banfield (3); Wirrilla—H. Schunke (4), A. B. Humphreys (4); Wolseley—G. D. Butler (3), W. J. Snoad (5); Wudinna—C. Johns (3), H. Pascoe (5); Yandiah—O. M. Keller (5); Yeelanna—L. E. Clarkson (4), R. W. Pearson (3); Yurgo—R. W. Jarrett (4).

The Minister's Address.

The Hon. A. P. Blesing, M.L.C. (Minister of Agriculture) said:—"For the fourth year in succession it is my pleasure to address the Congress of the Agricultural Bureau, which is one of the most important functions held annually in Adelaide, and which has rightly been called the Farmers' Parliament. In doing so, I would first like to congratulate you as the representatives of the Branches of the Agricultural Bureau, that wonderful organisation of mutual improvement societies for agriculturists, on having maintained the organisation up to this, the Forty-Seventh Annual Congress. I would like particularly to emphasise the pleasure I have in seeing so many young men and women present this evening; surely a good augury for the continued success of this widespread society. The attendance of so many agriculturists, representing as you do all portions of the State, is very gratifying to me as Minister of Agriculture, and I am sure also to all those connected with the Advisory Board of Agriculture, and to the officers of my Department.

Having been connected with the land all of my life, and still being actively engaged in farming, I can visualise your troubles, needs, desires, and efforts, and I can assure you that anything you might bring before me in my official capacity will receive the most sympathetic consideration.

CHANGES IN THE STAFF OF THE DEPARTMENT.

Professor Perkins has retired from the position of Director of Agriculture because he has reached the age limit for public servants, and you will agree with me that he carried out the duties of that office for a long period of time with full honour to himself and great advantage to the State. Recognising that Professor Perkins' usefulness has by no means ended, I have appointed him a Life Member of the Advisory Board of Agriculture, a position only conferred upon two men previously, and also to be Chairman of the Council controlling Roseworthy Agricultural College. Mr. W. J. Spafford was promoted to the position of Director, and brings a lifelong experience in South Australian agricultural industries to the position. Other changes in the staff of the Department of Agriculture have consisted in the promotion of Mr. R. C. Scott to be Chief Agricultural Instructor, and Mr. L. J. Cook to be Experimentalist, two appointments which will, I feel sure, give general satisfaction to all agriculturists in the country. From a grant made by the Commonwealth for investigation into the apple and pear industries, I have appointed Mr. H. K. Kemp to be Research Officer for a two-year period, and Messrs. E. B. Chamberlain and G. Harris as Packing and Re-working Instructors for one year.

At that important meeting of the Australian Agricultural Council held in May last, I was able to persuade the Ministers assembled to continue the bounty on export oranges for another year, to enable the citrus producers to organise themselves; to accept for export eggs cleaned in moist-cleaning machines for at least another year; and to call conferences for the standardisation of methods of analysis for articles required by primary producers in connection with their calling.

The Improvement of Wheat Committee has done extremely good work in checking the increase in area sown to poor quality wheats, and is still functioning, aiming at the improvement in quality of all wheats to be grown in the future.

I have given full support and encouragement to the creation of a Museum of Agricultural Equipment to be housed at the Show Grounds, and our appeal to country people has been very gratifying to the extent that, although only launched a few weeks ago, there are over 100 implements and articles exhibited this year. Should any of you know of other types that played a part in our agricultural progress, or articles of the same type but of greater age, or in better state of preservation, the committee controlling the Museum will be pleased to hear of them.

To make a lasting impression on the people of the country, and particularly on the younger people, the Centenary Committee is staging on December 22nd the greatest Pageant yet seen in South Australia—a Pageant designed to show clearly the great progress made during the 100 years since the original settlement of the State. In it will be portrayed the early struggles of settlers, the gradual overcoming of great difficulties, and the final successes of all of our ventures. I commend this Pageant to you, and any and all of you able to visit Adelaide about Christmas time should not fail to help swell the crowds to view this wonderful display.

The continued growth of the Agricultural Bureau is very gratifying, but more particularly so is the rapidly increasing strength of the women's branches. The womenfolk of country districts are especially eager to learn, and the formation of these women's branches give them an opportunity which did not previously exist.

Besides wishing the gathering a successful and instructional Congress, I would like to assure all producers present of my full sympathy towards all of their difficulties, and anything I can do in my Ministerial capacity I am most willing to put at their disposal should any of them care to approach me."

Mr. Murdoch proposed and Mr. Baily seconded a vote of thanks to the Minister for his address.

A Review of Twelve Months' Work.

The Hon. A. L. McEwin, M.L.C. (Chairman of the Advisory Board of Agriculture), in giving a review of the activities of the Board during the past year, said the Advisory Board of Agriculture has had two important changes in its personnel since the last Congress. Firstly, Professor Perkins, who had occupied the office of Director of Agriculture for a period of 22 years retired from the Public Service of South Australia under the provisions of the Civil Service Act. His services have not, however, been lost to the Advisory Board, as the Hon. the Minister has been pleased to appoint him a Life Member in appreciation of the valuable work which he has done for the farming community, and in order to depend upon his advice which has been valued so highly in the past. Secondly, there has been an addition to the personnel of the Board by the appointment of Mr. W. J. Spafford as Director of Agriculture. Mr. Spafford's appointment has been proclaimed throughout the farming areas of this State as one of great popularity and of assurance that the office of Director of Agriculture has been filled by one who will continue to serve the State with the similar thoroughness and distinction as his predecessor. On 30th June last the number of branches throughout the State was 346, with a membership of 5,500. During the past few years some of the branches lapsed into inactivity mainly on account of the abnormal times through which we were passing, and the Board decided to close those at Coulta, Bowhill, Edillilie, Overland Corner, North Booborowie, North Bundaleer, and Naracoorte. New branches were, however, formed at Karte, Brimpton Lake, Hilltown, Devlin's Pound, and Cambrai. Women's branches were formed at Karte, Myponga, Beetaloo Valley, Pinbong, Devlin's Pound, Georgetown, Yandiah, Echunga, Strathalbyn, Owen, and Koolunga.

The Board has held meetings regularly during the year, and there has not been any lack of material for it to consider. It acts as a clearing house for the numerous items submitted by Congress, Conferences, and branches. The Board takes the view that each item received is regarded by the branch responsible for its submission as one of special concern, either in a local or a State-wide sense, and consequently gives it careful thought and attention. The Board is then called upon to decide which resolutions or suggestions should be forwarded to the Minister for his consideration. In an advisory capacity, therefore, the Board has made many recommendations to the Minister. I propose to refer to some of the matters which have had its attention during the year just closed.

In view of the large amount spent on the Murray Swamp Lands, the Board made strong representation to the Minister to have an Agricultural Instructor appointed for that area. This appointment has since been made, and Mr. H. A. Follett is now stationed at Murray Bridge for the purpose of giving sole attention to the needs of settlers in the district allotted to him.

For some years the Lower Eyre's Peninsula District has sought the permanent services of a Stock Inspector, and farmers have appreciated the recent appointment of an officer of the Stock and Brands Department to that district.

Repeated requests for the appointment of a Veterinary Officer to the staff of the Department of Agriculture are still being received from branches. The Board is of opinion that the best arrangement would be the appointment of Veterinary Officers to fixed districts on somewhat similar lines to the apportionment of the present district instructors. Failing the wider scheme, however, we would like to see the appointment of an officer whose duty would be to give lectures and demonstrations to branches as was the case when the late Dr. Place was on the staff of the Department.

Similarly, in accordance with a resolution of the South-Eastern Conference, a recommendation was made asking for the appointment of a sheep expert.

More facilities for the extension of work at the Kybybolite Experimental Farm were requested at this year's South-Eastern Conference. The opinion of the Conference was that the work of the Kybybolite Farm was of national importance, and inquiries have, therefore, been instituted with a view to ascertaining what assistance can be obtained from the Commonwealth Bank in order to increase the scope of scientific work in this field of Departmental activities.

Branches on Eyre's Peninsula fully recognise the usefulness of the Minnipa Experimental Farm as a medium for the supply of seed wheat, and in response to appeals from that area, the Board has supported the request that this farm should be re-opened for that purpose.

The Board has been in collaboration with the Chief Horticultural Instructor (Mr. A. G. Strickland) concerning future work of the Blackwood Experiment Orchard. The Blackwood Orchard has a unique and valuable collection of fruit varieties, and Mr. Strickland has been asked if he would take a census of varieties with a view to eliminating those which may not be of value either for experimental or for commercial purposes, so that room may be found for other experimental work.

The Board has always given its entire support to any scheme to encourage tree planting, and made a special appeal to all branches in accordance with last year's resolution to set aside the May meeting of each year for the purpose of discussing this subject.

The attention of local governing bodies was drawn to the 1935 Congress resolution asking that shade trees be planted on their territories in order to prevent dust storms and erosion. The Director of the Local Government Department stated that the area of reserves and roadsides under councils' control was considerable, and councils were urged to safeguard trees and shrubs in such locations and to inaugurate a system of tree planting wherever conditions were suitable.

As there does not appear to be any possibility at present of the States combining to publish descriptions of noxious weeds, separate steps have been taken by the Department to publish in bulletin form the excellent series of articles in the *Journal of Agriculture*, written by Mr. G. H. Clarke, B.Sc., on "Important Weeds of South Australia." Part I. has been completed and Part II. is now being prepared.

Special reference was made at last year's Congress to the spread of Bathurst Burr, and branches were reminded that, as the Noxious Weeds Act was administered by district councils, attention should be drawn to instances where necessary action was not being taken. Any advice received by the Board in relation to a lack of administration in this respect would be forwarded to the proper quarter for consideration. In one instance, known to the Board, where farmers were alarmed at the spread of St. John's Wort, steps were immediately taken by the local governing body to eradicate it.

The Government has given consideration to the 1935 Congress resolution moved by an Eyre's Peninsula branch that an increase be made in the subsidy for the purchase of bulls my the Government paying the cost of transport. The Minister has informed the Board that approval has been given to pay the approved purchaser 50 per cent. of the boat charges, freight and wharfage to Eyre's Peninsula, Yorke Peninsula, Kangaroo Island or other islands off the South Australian coast.

Recommendations have been made on several occasions in the direction of the establishment of a condemnation fund for pigs. Branches will appreciate the action of the Government in bringing in a Bill for this purpose during the present session of Parliament.

It will be noticed on the agenda before you that the question of examination of stallions on Eyre's Peninsula will be again discussed. Last year the Chief Inspector of Stock stated that this portion of the State was an exempt area on account of the high cost of examination, and the passing of the amending Act which provides exemptions of a large number of stallions until July, 1938, was an additional reason for deferring action. There were difficulties in policing the Act while these exemptions continued, and these difficulties were likely to be much greater with the scattered population of Eyre's Peninsula. This matter will, however, come on for further consideration at the Free Parliament session on Wednesday.

The increased production of fat lambs on Eyre's Peninsula has made a corresponding demand on the facilities of treatment at Port Lincoln Freezing Works, and in response to a resolution of the Wudinna Conference, the Government has been approached with a view to extending the operations at Port Lincoln to cope with the bigger volume of trade.

The Board has endeavoured from time to time to obtain a revision of yard fees at country markets, but without result. These charges are apparently made by the Stock Salesmen's Association, and no doubt the Association considers them reasonable. It is questionable therefore, if any good purpose would be served by making further approaches for a revision, as recently requested by branches.

Action has again been taken by the Board to bring under the notice of the Government the opinion of Bureau members that bulk handling should be introduced into South Australia.

The Yorke Peninsula Conference made special reference to the apparent inadequate penalties imposed for stealing wheat or other farm produce. The Crown Solicitor has pointed out that this offence carries a penalty up to imprisonment of 5 years, and the punishment must be left to the discretion of presiding magistrates and judges. The probability of detection is a more effective deterrent than a larger maximum penalty, and the Board has been asked to encourage farmers and others to give their active assistance to the police in the detection of offenders.

The Board gave its support to the proposal that an advanced course in winemaking be established at Roseworthy College. This course has now been instituted, and it has been specially designed to give a higher status to the College in the teaching of this subject. The wine industry is of great importance to South Australia, and a thorough course of instruction at Roseworthy will obviate the necessity of students going elsewhere for education in the art of wine-making. The importance of the wine export trade will be dealt with by Mr. B. W. Bagenal at this Congress who will read a paper on the subject to-morrow afternoon.

In order to form a guide for future plantings in orchards, the Hills Conference asked that a census of apple plantings be taken. This was supported by the Board and legislation is now being considered to give effect to the proposal.

The Minister's attention was drawn to the Congress resolutions relating to the Dairy Produce Act, which was subsequently re-enacted.

Mr. Shepherd represented the Bureau at a meeting convened by the Standards Association of Australia to consider a proposal for the standardisation of wearing parts of agricultural machinery. The meeting was attended by representatives of various States and of the machinery trade. Mr. Shepherd reports that the meeting did satisfactorily preliminary work, and the resolutions and agreements should place the Association in the position of being able to progress in arriving at standards for those parts which have been specially selected as a beginning. It will be recollected that the Bureau has been interested in this matter for many years, and it is gratifying to know that the question of standardisation is taking a definite shape.

In reply to a Congress resolution, the Minister informed the Board that he was not prepared to consider an amendment of the section of the Bush Fires Act dealing with fire raking. The Minister pointed out that district councils should appoint fire controllers, and fire raking could then be done with the consent of one of them after taking due precautions in the matter of clearing inflammable materials.

The Women's Congress of last year asked that a dentist be sent to country schools at least once a year. After enquiry, it was found that most of the work of 2 dentists and 2 assistants during the previous 18 months had been done in 53 country schools, and with the available staff it was impossible to carry out the request.

Branches have asked that provision be made by legislation for the simultaneous destruction of foxes. For the information of members it is pointed out that the word "vermin" includes foxes under the Vermin Act, and that legislation is already in existence for district councils to take the desired action.

WOMEN'S BRANCHES.

At this time last year we had 52 Women's Branches on our Roll; to-day we have 63. Many of these branches have been in existence for a number of years and are still doing good work.

The Agricultural Bureau commenced its operations as a "men's" organisation and remained in that state for close on 30 years. With the advent of Women's Branches there has been a noticeable enthusiasm in Bureau affairs in many districts where local activities appeared to have been on the decline. The establishment of Women's Branches has now gone past the stage of being a "new idea," and this feature of Bureau work has come to stay. Their meetings have been well attended and their discussions cover a wide range of important subjects associated with minor farm work and domestic activities. Several district Conferences have been held during the year, and in some instances the attendances at these Conferences have been greater than those of the men. This all goes to show the growing popularity of the movement and it augurs well for the future work of Women's Branches.

CONCLUSION.

On the close of a year's work we are naturally reminded of the assistance we receive in an honorary way from various quarters. In the first place, we have the services of an army of active secretaries who devote much of their time to the affairs of their branches. We cannot overestimate the value of this work, as the success of the whole organisation depends very largely on the energy and enthusiasm of branch secretaries, and members are enjoined to support them at all times by regular attendance at meetings and by contributing their share towards the yearly programme. We have received greater assistance this year from the School of Mines through the services of Mr. Goddard (Assistant Teacher of Wool Classing) who has given numerous demonstrations and lectures. Many of the Women's Branches have had the privilege of hearing addresses of Miss Campbell of the Education Department who has attended meetings whenever it has been practicable for her to do so.

Crop Competitions have been materially helped by a Government subsidy and by special prizes from the Millers' Produce Company, which, by the way, have again been donated for the forthcoming competitions. The Royal Agricultural and Horticultural Society has continued its prizes given for so many years for the champion wheat crop and for pruning competitions along the River Murray, in the Lower North and at McLaren Flat. Further support has also been given by the Dried Fruits Association in the River Murray competitions, and another competition is to be held for the Langdon Parsons Trophy in both the River Murray and the Lower

North Districts. These are but few of the prizes or donations offered. Prizes have been given in numerous other centres by a large number of donors, and to all of them the Board expresses its thanks and appreciation for their interest shown in this organisation.

The Board has kept in close touch with the Department of Agriculture in many matters requiring departmental attention. One of the aims of the Bureau is to maintain contact with officers of the Department who, in turn, look to the Bureau as a means of placing their services in the direction which will give the best results. An exchange of ideas with a group of farmers necessarily has its influence on farming practices, and collaborative work of this kind constitutes one of the Bureau's most important functions. There is ample evidence that the work of officers of the Department is appreciated, as we find Bureau members speaking at conferences and at other meetings in the highest terms of the advice and assistance received. We are aware that the Department is constantly in receipt of correspondence seeking information on a variety of subjects, and there are repeated requests for lectures and demonstrations. All of these factors go to show that officers of the Department have the entire confidence of members of branches, and members of the Advisory Board are convinced that excellent work is being accomplished throughout the State by the frequent exchange of ideas between technical men on the one hand, and the farmer on the other. Our organisation will flourish and function to its fullest extent so long as its members continue to show that they place the same confidence in Departmental officers as they have shown in the past.

Germination of Lucerne Seed.

The Secretary of the Nantawarra Branch of the Agricultural Bureau asks, "When sown under favourable conditions, how long does Lucerne seed take to germinate?" In reply, Mr. W. J. Spafford (Director of Agriculture) says that Lucerne seed, containing a low proportion only of "hard" seed, will be showing above the ground in a few days time if sown to a shallow depth in sandy soil in spring after the soil has warmed up, but if seeded into heavy land in late autumn or winter, may take over a fortnight. Samples of seeds containing much hard seed germinate very irregularly and some of the seeds may not shoot until the next year after seeding.

Grass for Swamp Lands.

The Secretary of the Hope Forest Agricultural Bureau who asked, "Is there a grass that will grow on uncultivated swamp land, apart from Rye grass?" has been advised by Mr. W. J. Spafford (Director of Agriculture) that there is not one of the Rye grasses which will grow well on uncultivated land. Provided that the swamp land is free from trees, shrubs, and bushes, there are several good forage plants which will grow strongly if they get proper treatment, the principal ones of which are Strawberry Clover, White Clover, Kikuyu Grass, Buffalo Grass and Tall Fescue, but all of them, with the possible exception of the last, are extremely difficult to eradicate if the land is required for cropping. One of the few grasses which will grow strongly in such conditions and can still be got rid of fairly easily, is Yorkshire Fog Grass.

The Citrus Industry of America

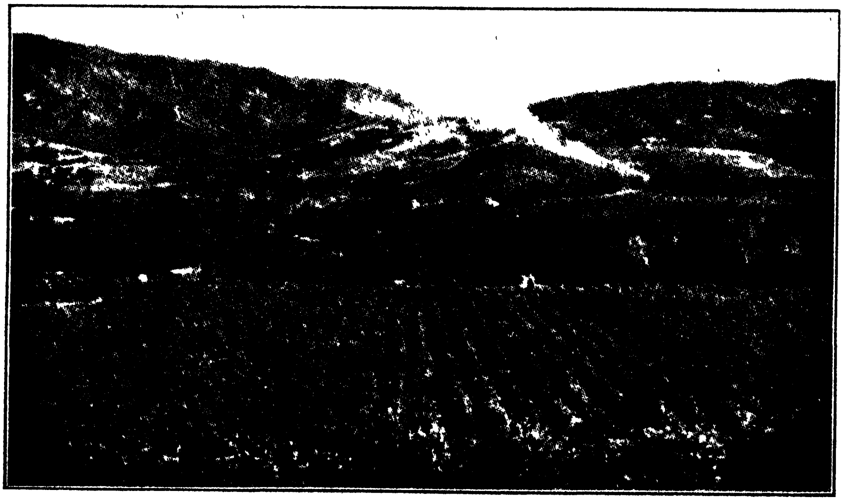
Paper read at 1936 Agricultural Bureau Congress.

[Report to His Excellency Sir Winston Dugan, K.C.M.G., C.B., D.S.O., Governor in and over the State of South Australia and its Dependencies in the Commonwealth of Australia, by Mr. F. H. Metters, Murray View, via Morgan.]

In the month of October, 1935, I left Australia for the United States of America, and disembarked at San Francisco on the 4th November. The object of my visit was to study first hand the citrus methods and problems in that country, particularly in regard to cultural, organisation, packing, transport and marketing. From San Francisco I journeyed south to Los Angeles, which city is the centre of the enormous producing district of Southern California. Thence I went to Riverside, sixty miles east of Los Angeles, which I established as my centre.

Before reaching America it was my intention to visit the other large citrus producing States, namely, Arizona, Texas and Florida. This idea was subsequently abandoned, as in the limited time I had at my disposal and by the adoption of that schedule, I would no more than gain a cursory survey of the industry. As the climate, as well as the cultural and irrigation practices and problems of Southern California appeared to be somewhat similar to those obtaining in South Australian citrus districts, I decided to devote the whole of my investigation to that area.

Being under the impression that the harvesting of Washington Navel oranges in California commenced in November, my visit was timed accordingly. This, however, proved not to be the case, and harvesting does not seriously commence till early January. At the time of my arrival the Valencia orange crop was virtually finished.



[*Photo. Citrograph.*

Typical view of fine producing citrus groves in California.

In this report I propose confining my remarks mainly to Southern California.

All values herein are given in sterling.

Southern California is divided from the Mojave Desert, lying to the east, by the San Bernardino range of mountains, and the citrus is grown in long fertile valleys running towards the Pacific coast. There is no native tree growth either on the mountains, or in the valleys: but millions of imported trees, principally the Tasmanian Blue Gum, the Brazilian Pepper tree, Pines and Palms, have been planted, and these have vastly improved the appearance and commercial value of the countryside.

The orange trees are planted right up to the foothills, the peaks of which are often snow-capped. The climate is hot in summer with occasional heat waves, and mild in winter, and is subject to heavy frosts. At one time Southern California was largely planted with deciduous trees and vines; but in the course of time these have given way to citrus and walnuts.

[*Photo. Citrograph.*

Typical orange grove, Southern California. Note absence of fences.

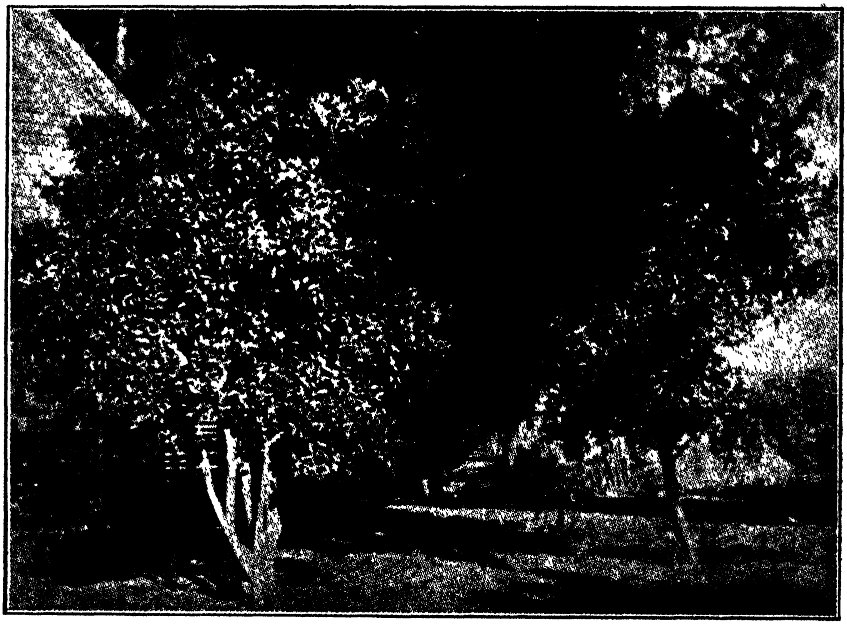
It has been found by experience over a number of years that certain districts and soils prove more suitable to certain varieties of citrus; for instance, Riverside is more particularly suited to the Washington Navel orange. This variety is mainly confined to Riverside, San Bernardino, Los Angeles and Tulare Counties.

Values of orange groves range from £200 per acre for the poorer types to £400 for the better. But I doubt if one would find sellers of the latter. Prior to the depression, values were much higher, and many properties changed hands at £1,000 per acre. I came in contact with land in the Upland district which was being prepared for lemon growing. The virgin land, which was covered with small bushes and small to huge granite boulders, cost £100 per acre. This was costing £200 to clear, and then the land had to be planted and maintained for several years before the trees came into profitable production. This class of soil is, however, very rich, and ideal lemon country.

The American crop of citrus was a record in 1935, and I understand that the output was 30 per cent. in excess of any previous crop. Thousands of acres which were planted just prior to the depression are now coming into production, and this fact has a bearing on the present huge out-turn.

I saw one of the two parent Washington Navel orange trees. This was introduced into California by Mrs. Eliza Tibbetts in 1873 from Bahia, Brazil. It is quite a small tree, is still bearing fruit, and is planted in Magnolia Avenue, Riverside. These two trees really laid the foundation of the Washington Navel orange the world over.

One of the outstanding features I encountered was that the grower is a grower only, unless he is outside the co-operative organisations. He does not even harvest the fruit, and in many instances leaves fumigation and pruning in other hands. Where possible this policy should be adopted in Australia.



[*Photo. Citrograph.*

The original Washington Navel Orange Trees.

Grapefruit is giving the Americans much thought to-day. They are already over-producing, and there are thousands of acres yet to come into bearing. The several States are much concerned as to how they are going to handle the position when the new areas reach production, but they are confident that with extensive advertising, and propaganda, and the possibility of increased consumption, the future disposal of the fruit at remunerative prices may not present as many difficulties as now appear.

Since December, 1933, a marketing agreement and licence, under the Federal Agricultural Adjustment Act, has been operating for oranges and grapefruit in California and Arizona. This seeks to increase returns to growers by regulating the flow of fruit despatched to market. The scheme was requested by the industry, to which it has given material benefits. The agreement was recently extended for a further 12 months.

The Commercial Citrus Grove.

Southern California is planted mostly with citrus and walnuts, the former largely predominating. The groves are set out very regularly, and everything connected with the properties is neat and orderly. The residences are substantial, mostly two stories, and surrounded with attractive flower gardens, lawns, shrubs and ornamental trees. Fences are not in evidence, and all properties are open to the road. The pride taken by "Sunkist" growers, that is, those operating through the Californian Fruit Growers Exchange, is indicated by the fact that every orchard bears a neat enamelled sign bearing the name of the grower and the words "Sunkist Grower."

The average property contains from 10 to 12 acres, which is all planted to citrus. There are, however, many large properties, some comprising 700 to 1,000 acres, and even larger. These are generally held by corporations.

Breakwinds are used extensively, and it is generally agreed that each 10 acres should be so protected. The Tasmanian Blue Gum is used extensively for this purpose, and has proved most effective.

[*Photo Citrograph*
Tasmanian Bluegums are extensively planted as break-winds.

The average quantity of Washington Navel oranges produced in California during the five-year period 1927-1931, was 3½bush. per tree. A well cared for orchard produces 4 to 5bush., and I came in contact with many groves, including large acreages, averaging 10 to 12bush. per tree. Our standard packed bushel case contains about the same weight as the loose fruit contained in their field picking box.

Central California.

This is a large citrus area situated in Tulare County, some 250 miles north of Los Angeles, and 50 miles south-east of Fresno, and embraces the districts of Tulare, Lindsay, Porterville, &c. Its climate, and cultural and irrigation practices are somewhat similar to those obtaining in Southern California; but the product is marketed a little earlier. The fruit is harvested as soon as it is tinged with colour, and then treated with ethylene gas in order to colour the rind thoroughly. All fruit must, however, pass the necessary maturity standard before being accepted by the packing houses. This centre is subject to very early and heavy frosts. Otherwise my remarks on Southern California apply generally to this district.

General Appearance of Trees and Quality of Product.

On the whole, excepting the damage occasioned by the hot winds in October last as mentioned elsewhere, the trees were in excellent heart, and the older plantations (50 years) were certainly in their prime and in full vigour. There is little evidence of off-type fruit. Undoubtedly commercial competitive conditions have forced the elimination of this class of fruit from the market.

The fruit is of very fine even type, with a thin glove-like skin appearance, is full flavoured, juicy and comparatively free of rag. The freedom of blemishes on the rind was most noticeable; this is due to windbreaks, treatment against thrips and other pests, and the absence of deadwood. The average yield of high grade fruit similar to Sunkist grade, and having a maximum skin blemish of three per cent., is 74 per cent. of production. If a grower produces under 70 per cent. of this grade he is not considered a successful grower. The better types of orchards produce as high as 90 per cent. I estimate our average of this grade in South Australia to approximate 20 per cent.

Rootstocks, Buds, Plantings, &c.

Highly specialised citrus nurseries propagate the young trees for the orchard, and only well-grown rootstocks and selected buds are used. Up till 10 years ago the sour orange stock was in general use; to-day the tendency is towards the sweet orange stock, and it is stated that present plantings comprise about 50 per cent. each sour and sweet stocks. The rough lemon or Citronella stock is unknown. The principal reason for the production of a uniform line of fruit, consistent in bearing, and freedom from off-type, is because for many years buds from only selected trees have been used. I am of opinion that this factor has a bigger bearing on quality and quantity production than most Australians are aware of.

The main plantings in California comprise Washington Navel and Valencia oranges, Grapefruit, and Lemons. Other varieties are not considered profitable. The Valencia orange is, in my opinion, similar to the improved type of Valencia introduced here from Berri and Mildura.

Orange trees, as a rule, are not allowed to branch within 30in. to 36in. of the ground. The trees are generally planted at from 70 to 110 to the acre; but in some of the older orchards there are considerably more per acre, and in many instances the trees are almost interlaced. The general ages of the trees range from 20 to 50 years; but there are large areas of younger trees.

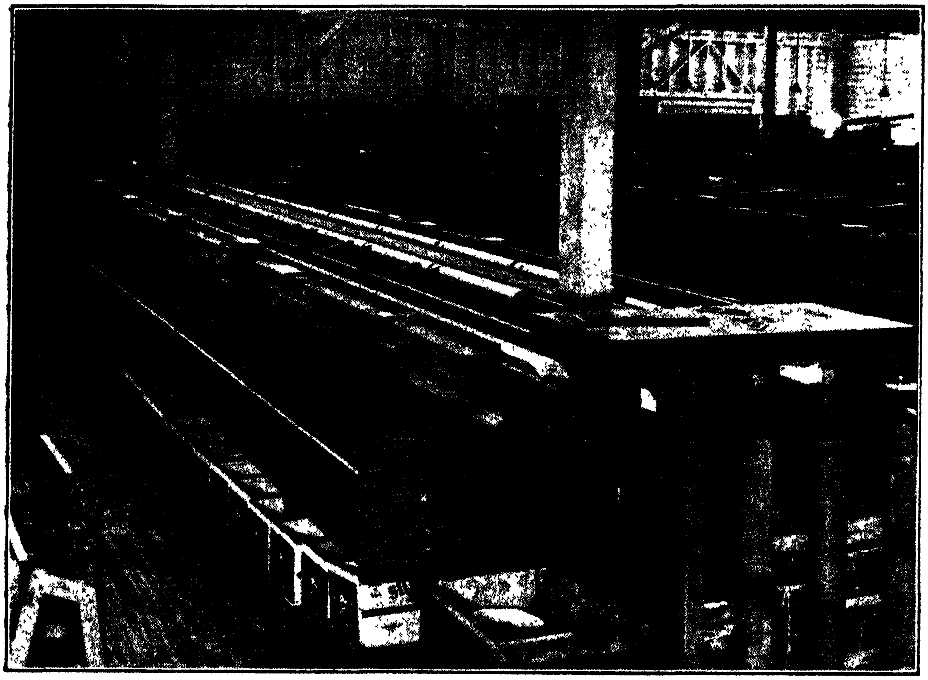
Climate and Soil.

The climate of Southern California is of an arid nature and subject to long rainless spells and heat waves. In these respect the conditions are somewhat similar to those in our River Murray belt; but their humidity is more pronounced than ours, and they are subject to severe frosts which, at times, materially affect the foliage of the trees, as well as rendering large quantities of the fruit unmarketable. In October, 1935, this centre experienced a hot wind blast from the desert, which in places partly, and in other places wholly, defoliated large numbers of trees. The fruit crop was also badly affected, the loss ranging up to over 20 per cent. with an average estimated loss over the whole crop of 12½ per cent.

The soil is largely of a sandy nature, generally of a greyish-brown colour, and much heavier than our Murray Mallee soil. It is of good depth, and has plenty of body; but I am of the opinion that our soil is capable of equal production if we apply similar cultural practices.

Packing Houses.

California is well provided with up-to-date and highly efficient packing houses for the processing and packing of citrus fruits. These are equipped with modern machinery for handling, gassing, washing, processing, packing, and box making, and every effort is made to eliminate hand labour and reduce costs. It requires an annual output of 160,000 to 200,000 boxes to warrant the capital outlay essential to the establishment of a fully equipped installation. The larger houses handle much in excess of these quantities. All operations, excepting the sorting, wrapping and packing of the fruit, are done by machinery, and these include boxmaking, lidding and strapping the boxes, pasting labels on the boxes, washing, processing and branding the fruit, automatically counting the fruits, grades, &c.



Interior of a modern packing house, Southern California.

In the majority of the houses all fruit is washed, treated with one of the several chemical preparations for the prevention of decay, waxed and branded. A few houses, however, only dry brush and brand the fruit. Fruit is invariably packed as soon as possible after harvesting.

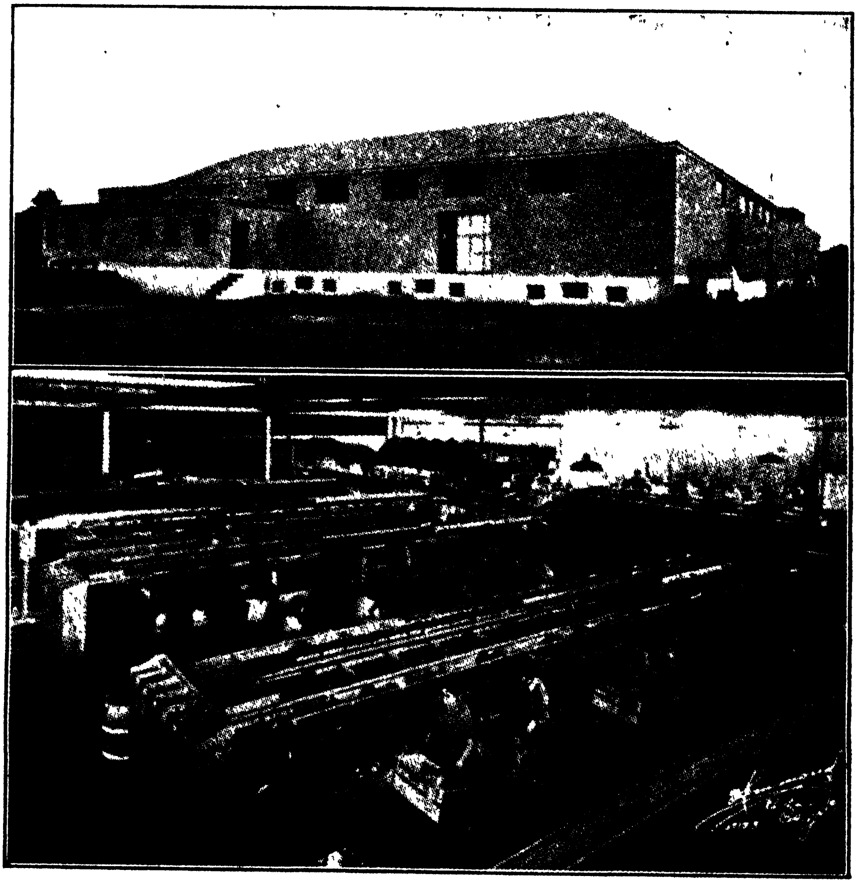
In every operation the greatest care is exercised to avoid damage to the fruit, and gloves are worn by everyone. Female labour is used almost exclusively in grading, sorting and packing. The fruit is culled very drastically, and is generally sorted into four grades. The classifications used by the Californian Fruit Growers Exchange are:—

First quality, Fancy (Sunkist).
Second quality, Choice (Red Ball).
Third quality, Standard.
Fourth quality, Culls

The permissible area of skin blemish on Sunkist quality is 3 per cent. of the orange. The first and second qualities are the only ones packed, and these are the only grades despatched outside California; the third is sold loose in the box, and the remainder used for by-products. A large proportion of the crop is used for the manufacture of drinks and by-products.

The only box used is the standard Californian box of two compartments. Our Australian export box is identical with this. These boxes are well ventilated, have a flexible four-piece unitised lid, and are centre strapped. For export purposes the lid is wired at each end. The box is printed with an advertisement on each side, and attractive labels are used. All branded fruit is wrapped in printed tissue paper wraps. The gross weights of the packed boxes are approximately as follows:—Washington Navel—Domestic 85lbs., export 78lbs.; Valencia—Domestic 89lbs., export 80lbs. A railcar load consists of 462 boxes of oranges, or 348 boxes of lemons.

A flat charge of one dollar (4s. 2d.) is made to cover costs of harvesting, transport to packing house, and packing and placing on rail, Exchange, Head Office and District charges. As is usual with co-operative enterprise this charge is subject to rebate to growers at the end of the season; this generally amounts

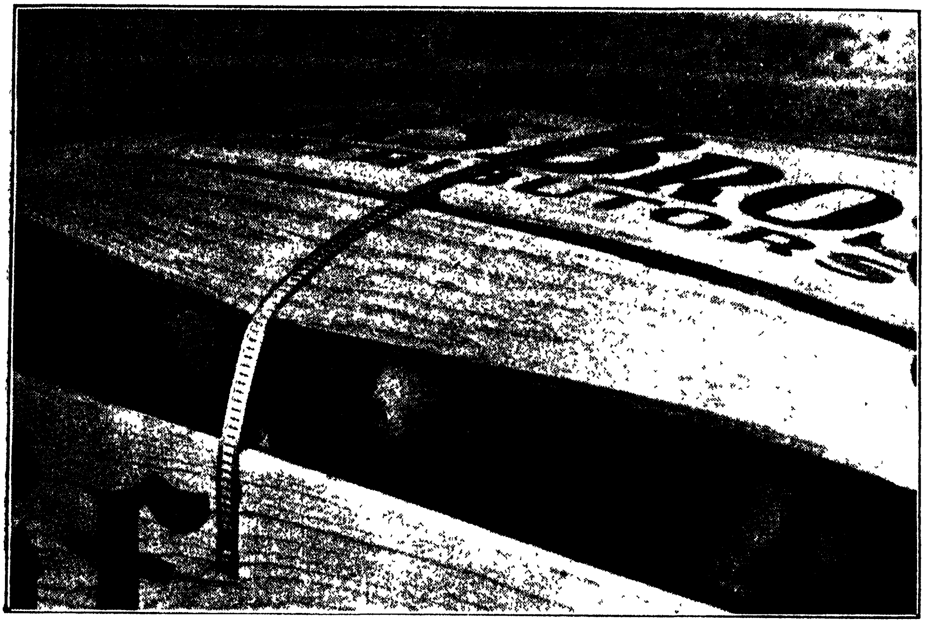


[*Photo. Citrograph.*

A modern, fire-proof packing plant has but recently been completed for the Exeter Citrus Association. The views above show the appearance of the house, both outside and inside. This plant replaces one completely destroyed by fire a few months ago. Photos. by Hammond, Porterville.

from 10d. to 1s. Of this charge 7½d. is absorbed in harvesting and haulage to the packing house, 2s. 1d. in packing charges (the made up box costing 7½d.), and the balance in Exchange and other charges.

Although many different chemical preparations are used for the prevention of decay, borax appears to be the most common. Since the introduction of these preservatives wastage in fruit between packing house and consumer has been materially reduced; but it must be borne in mind that, despite these various treatments, heavy waste still develops in certain periods of the season.



A packed Californian case of oranges, showing bulge.

Cultural.

Tractors and mules are used for operating orchard implements, the former largely predominating. Heavy type disc and mouldboard ploughs are general, and disc or tyne cultivators for cultivating. The Rotary Hoe is unknown.

Whereas cultivations were formerly deep and frequent, present-day practices are generally for light working, and as infrequently as possible. The periods between cultivations are governed to a large extent by weed growth, and the necessity of maintaining irrigation furrows in a serviceable condition. As a rule the cultivator is used only after every two or three irrigations. This practice is not adopted by all growers, as some still till the soil frequently. It appeared to me that the absence of the intense cultivation that prevailed formerly, is due in part to economy as a result of the depression, and in part to the now generally accepted principle that the less frequent stirring of the surface soil is beneficial to tilth, root development and moisture penetration.

Irrigation.

California is in the main an irrigated State, this being wholly so in the citrus areas. In Southern California the average annual rainfall ranges from 10in. to 15in. according to the districts. From May to December, 1935, only 2½in. had been registered. At the time of my visit the plains and mountains were entirely devoid of natural grasses. As a rule, conditions are very dry till about the end of December, after which the winter rains commence. Up till mid-December there had been eight citrus irrigations, and preparations were being made for another. The average number of citrus irrigations is from seven to eight per annum. Water is applied regularly every 30 days during spring, summer and autumn, with from one or two applications during winter, according to the moisture content of the soil.

Districts vary in the quantity of water used from 25 to 40 acre inches; but the average is about 30in. applied at the rate of 3½in. to 4in. per irrigation. Owing to shortage of water no special or intermediate irrigations are given. The furrow system is almost universal. Furrows are placed as closely together as possible. In some instances a straight course is used; in others the furrows are checked or zig-zagged. The water is passed along these furrows as quickly as possible, and water runs are from four to six chains.

Whereas the Australian practice is to place the outside furrow at the fringe of the foliage of the tree, Californians furrow as far under the trees as their implements will permit. Partly for this purpose the foliage is kept well off the ground.

Most of the water is obtained from deep wells by means of pumps. In certain localities there is a definite shortage of irrigation water, and in two districts I noticed that certain sections of areas had been abandoned as a result of water shortage.

Seepage or water-logging of soils is not much in evidence; this is owing to the type of subsoil, and the light irrigations.

Cost of water varies considerably; but taken generally our costs compare favourably with theirs. Water and irrigation labour cost from £3 to £5 per acre per annum. Power for lifting water is very cheap, being quite commonly obtained from engines using natural gas.

Fertilisers.

Californians are heavy users of fertilisers, more particularly those containing organic matter and nitrogen. It has been proved beyond doubt that barnyard manures, cover crops, and nitrogen are the essential ingredients to apply to the soil for growth and production purposes. Nitrogen is introduced mainly by the use of animal manures, cover crops, fish meal, sulphate of ammonia, nitrate of soda, nitrate of lime, &c. Barnyard and hog manures are applied generally at from five to 10 tons per acre annually, and in many cases heavier. Large quantities of Lucerne and Bean straw are transported long distances and applied heavily. Green humus crops are also grown extensively from Melilotus, Purple Vetch and Mustard. The general practice is to apply about 4lbs. of nitrogen annually, one-half each from organic (preferably cattle manure) and inorganic sources.

The use of phosphate and potash is not much in evidence. It has been proved that these elements are freely distributed throughout Californian soils by nature, and their introduction by artificial means has not produced any definite results, either in tree growth or production.

Cover crops are sown in late summer and early autumn, and disced under in the early spring. Organic manures are applied in the early fall, and nitrogen in early spring.

Pests and Diseases.

California is subject to many orchard pests and diseases. Red, black and wax scales are very active, and drastic action is taken against these by means of fumigation and spraying. At times thrips are very prevalent, and usually this pest is treated about three times in its season, either by means of spraying or dusting. The co-operative packing houses do most of the fumigation, &c.

Frost Protection.

Much money has been expended in fighting frost. Most orchards are equipped with oil-burning heaters, and these entail a heavy capital outlay per acre.

Radio messages are broadcast, and growers warned if there is any likelihood of frost. This gives the grower the opportunity to prepare for his attack, and these heaters are kept burning during the night till all danger is over, usually from four to five hours.

Central California is particularly susceptible to frost, and for this reason all its fruit is harvested early in the season, and before Southern California commences.

Harvesting.

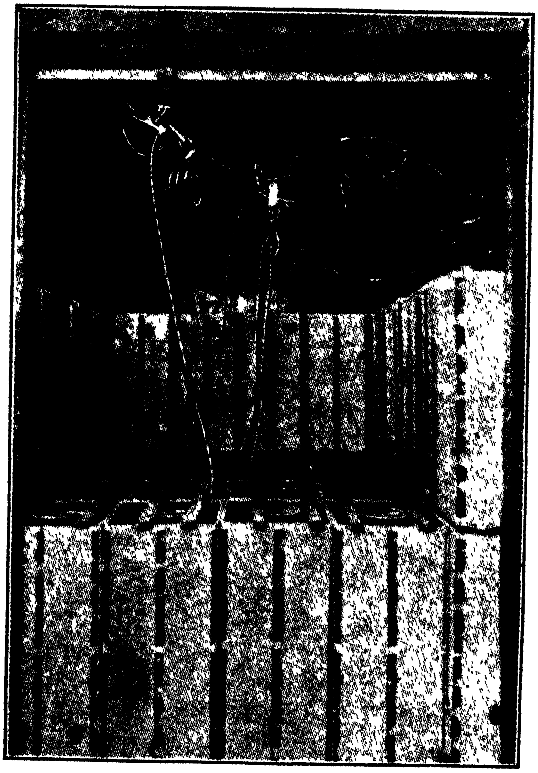
Harvesting is, in my opinion, the most important operation in connection with successful marketing, and is the keynote of the fruit reaching the consumer in sound condition. The grower, excepting those large producers who have their own packing houses, confines his activities to the production of fruit. The harvesting, haulage to the packing house, and packing are conducted by the packing houses. These are mostly co-operative, and they send teams of selected men with capable foremen to the orchards for harvesting purposes. The use of picking bags, field picking boxes, fruit clippers and gloves is universal, in fact one would say compulsory.

Transport.

Most of the transport of citrus to the other States is by means of the railways, which are operated by private companies. These give the industry excellent service, and the system is highly organised. Where conditions warrant, such as long distance transport to the East, iced, ventilated vans are used in the summer, and a fast service maintained. In very cold weather oil heaters are used.

The packed boxes of fruit are stacked two high on end in the vans, and secured with battens. The type of box used has been designed to fit compactly into the van, which holds 462 boxes.

For conveyance beyond California a flat rail transport rate of 4s. 9d. per box operates. The boxes are tightly fitted into the vans by means of a machine using an expanding device. The motor truck is also used extensively. Fruit for export is, when possible, shipped from Los Angeles and other Pacific ports.



Interior view of refrigerator car equipped with electrical thermometers showing location of cables and thermometers. Car partially loaded with Sunkist fruit about to go to the eastern markets in the experimental shipments under supervision of Government observers. View by Southern Pacific news bureau for Citrograph.

Pruning.

The practice of pruning citrus is universal. On the whole pruning is light; but the trees are kept fairly well open for ventilation and sunlight purposes, and the foliage is kept well off the ground. Every effort is made to eliminate dead wood, and when possible growers lightly trim out their trees annually. This practice considerably reduces the cost of pruning over, say, a 10-year period. It has been found that heavy pruning of healthy trees is detrimental to subsequent cropping for a year or two.

Labour.

Large numbers of Mexicans are employed in the orchards and packing houses. Unskilled orchard labourers are paid 12s. 6d. per day. Packers and sorters, mostly women, are paid at piecework rates. Machinery has replaced labour to a large extent in both orchards and packing houses.

Citrus Experimental Station.

The Citrus Experimental Station, which is a division of the University of Southern California, is situated about four miles south of Riverside. It has some 350 acres of all known varieties of citrus under its control, and experiments of every description are conducted, including rootstocks, bud selection, cultivation, pruning, irrigation, fertilisers, soil analyses, insect and fungus control, &c

Dr. L. D Batchelor is the Director, and has associated with him gentlemen of world renown in citrus investigation.

I commenced my inquiries at this station, and met Dr. Batchelor, to whom I presented my Commission. He was very kind to me, gave me his undivided attention, and facilitated my every movement. In turn, I was introduced to the several Professors and other members of the large staff, who all treated me most courteously, and freely made all information available. In all, I spent over a week at the station, and the knowledge gained is embodied in this report.

It must, of course, be realised that in that short period it was impossible for me to acquire more than a superficial idea of their experiments and activities. One would need many months to study closely their results.

Students from every part of the citrus world, excepting Australia, are studying at this station, spending from two to three years there. It is most regrettable that Australia is not represented, as we undoubtedly have much to learn on citrus culture, and should make every effort to keep ourselves abreast of modern thought and methods.

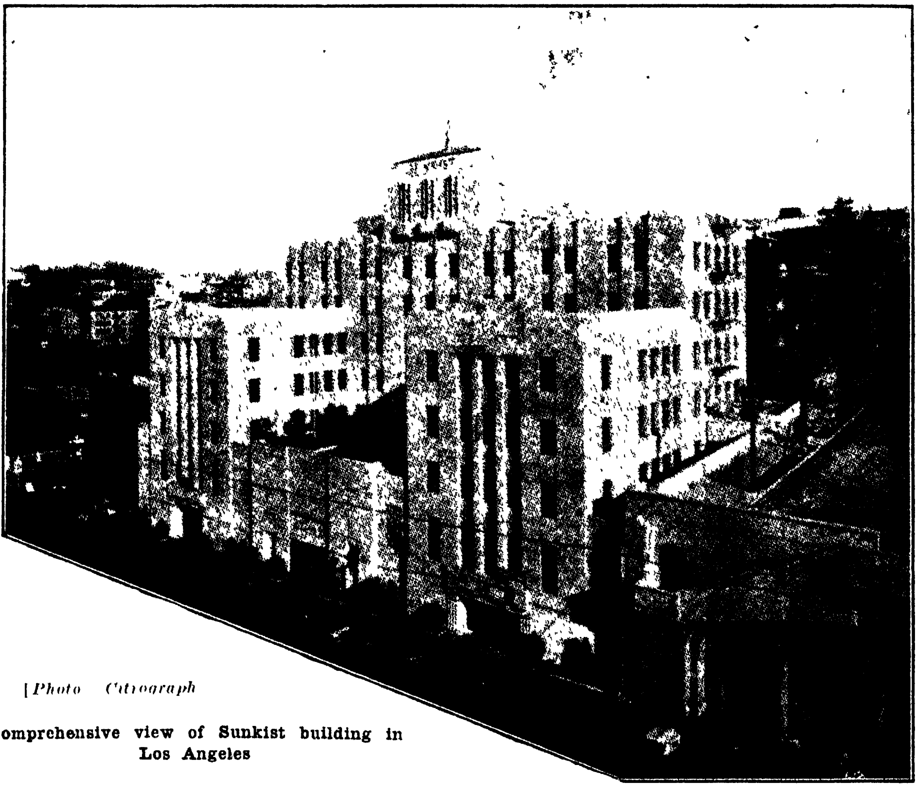
The buildings are extensive and modern, and contain efficient laboratories, libraries and equipment.

Experiments were originally commenced at the Rubidoux Experiment Station in 1907, a few miles further south of Riverside. This station, however, was abandoned a few years ago, and activities transferred to the present station. The new station was planted in 1917, but no experimental work was conducted, or manures applied until the trees were ten years old, the trees being simply maintained during that period.

The experiments are closely watched by the industry, and the recommendations emanating from the station have been put into universal use by nurserymen, growers, packers, &c., and have proved of untold value to all concerned.

Organisation.

Marketing and many other sections of the industry are carried out by co-operative bodies capitalised and controlled by growers. The largest concern is the Californian Fruit Growers Exchange, having a membership of over 13,000 growers. Its head office is at Los Angeles, where it occupies a large building recently erected out of its funds. Originally this organisation was established for marketing purposes only, but in the course of time it has materially extended its activities, which now embrace field and cultural problems, supplies, by-products, packing house supervision, fertilisers, fumigation and general pest control, also having its own legal department. In fact every phase of the industry is dealt with. The Exchange is really a wonderful business organisation, highly efficient, and of immense benefit to members. There are over 20 district Exchanges connected with and controlled by the head office and these are in close and constant touch with growers, packing houses, railway companies, &c. These sub-exchanges are equipped with a multi-telegraph system, and the machines are continually giving out reports regarding markets, condition of fruit on arrival at markets, and other essential details.



[*Photo* *Citrograph*

Comprehensive view of Sunkist building in Los Angeles

The Exchange controls 75 per cent. of the production of citrus in California, embracing most of the smaller growers, some of whom would be considered large in Australia. The balance is handled by another co-operative body, the Mutual Orange Distributors (10 per cent.), and individual large growers and dealers.

Bulletins and wireless broadcasts are frequently supplied to growers, giving all the latest information and advice.

The Exchange controls all its members' export and advertising. Advertising is conducted on an enormous scale, and cost the Exchange £400,000 in 1935.

The words "Sunkist" and "Red Ball" are registered by the Exchange for use in connection with its first and second grade brands respectively, and all fruits packed by houses operating under these brands are so branded on the rind. Close supervision is maintained by the Exchange to keep the quality of the fruit up to Exchange standards, which are strictly enforced.

It was my good fortune to attend the 1935 annual conference of the Exchange, at which 250 to 300 delegates were present, including District, Exchange and Packing House managers. It was rather interesting to learn that their problems have much in common with ours.

Statistics.

During my inquiries I was able to gather the following statistical information relative to citrus acreages and production, which will serve to indicate to what tremendous proportions the industry has reached in America. The figures are abstracts from official returns issued by the Federal and State Departments of Agriculture, and the Fruit Growers Exchange.

United States Acreage and Packed Box Production.

	Acreages, 1935.	Production. 4-year Average, 1921-1924. Boxes.	Production. 1934-1935 Season, Boxes.
Oranges	498,000	30,988,000	64,241,000
Grapefruit	192,000	8,554,000	21,357,000
Lemons	52,000	?	10,400,000
Total	742,000	39,542,000	95,998,000

California and Arizona Acreage and Production.

	Acreages, 1935.	Production, 1934-1935 Season. Boxes.
Oranges	239,835	45,900,000
Grapefruit	20,600	3,407,000
Lemons	52,000	10,400,000
Total	312,435	59,707,000

Of the 237,000 acres of oranges in California, Washington Navel oranges comprise 100.000 acres, the balance being Valencias.

Thousands of carloads of citrus are converted into drinks each year. In fact I have heard it stated that this State (California) consumes as many oranges in the form of drinks as in fresh fruit.

Recently a formula has been discovered for canning orange-juice, and last year 1,386,000 boxes, representing 50,000 tons of citrus, were absorbed in this manner.

The following were the average gross f.o.r. prices obtained per packed box at despatching stations in California:—

	Values. s.	d.	Marketing Periods.
Winter oranges	8	0	November-April
Summer oranges	8	9	May-October
Grapefruit	6	2	November-April
Lemons	11	4	November-July

In the 1934-1935 season, 2,500,000 boxes of citrus were exported (other than to Canada) from the United States of America.

[*Photo. Citrograph.*

Citrus grower's home at Claremont, California.

CITRUS PRODUCTION, RETURNS AND COSTS.

The following tables were compiled by the Agricultural Extension Service, University of California, United States Department of Agriculture, and cover the period 1st February, 1934, to 31st January, 1935. Accurate figures were kept by the growers concerned, and submitted monthly. The prices are for fruit delivered to the Packing House door in field boxes. Labour costs included cultural, picking and haulage, and the value of the operator's own labour but not as salary for management. Cash overheads include general expenses, County taxes, machinery repairs and insurance. Material costs include water, fertilisers, sprays and frost protection. Depreciation is on plant and improvements.

Navel Oranges (Riverside County.)

Number of Records.	More Profitable Orchards.	Less Profitable Orchards.	Average All Orchards.
Total acres covered	6	6	12
Average acres	81	72	153
Average age trees	37	38	38
Average No. trees per acre	89	91	90
Average yield packed boxes per acre	261.6	163.5	215.5
	£ s. d.	£ s. d.	£ s. d.
Average price per packed box	0 5 2	0 4 2	0 4 8
Income per acre	67 8 6	34 10 0	50 19 3
Cultural labour cost per acre	6 5 6	8 11 5	7 8 6
Harvesting cost per acre	6 8 5	3 13 0	5 0 9
Total labour cost per acre	12 13 11	12 4 5	12 9 3
Material cost per acre	12 12 2	12 3 0	12 7 7
Cash overhead cost per acre	6 17 10	6 11 8	6 14 9
Total cash costs per acre	32 3 11	30 19 1	31 11 6
Depreciation per acre	2 12 4	1 14 5	2 3 5
Total cost per acre	34 16 3	32 13 6	33 14 11
Net income per acre	32 12 3	1 16 6	17 4 4
Grade percentages of fruit—	%	%	%
Fancy	72.2	53.0	62.6
Choice	12.1	7.3	9.7
Standard	10.4	5.9	8.2
Unclassified	.2	32.6	16.4
Culls	5.1	1.2	3.1
	100.0	100.0	100.0

Conclusion.

In concluding this report I think it only fitting to emphasise that the success attending citrus production and marketing in the United States has been attained after much endeavour by the following factors:—The concentration of citrus in districts entirely suited to its successful culture. The suitability of rootstocks, and selection of buds from proved trees as regards quality, quantity and continuity of production. The elimination of uneconomic and off-type fruits. The scientific study and application of the requirements of the soil and tree, particularly in respect to fertilisers and irrigation. The control of pests and diseases. Efficiency of organisation, packing houses, transport and marketing. Advertising and creating public demand.

We, in Australia, are facing similar problems that America had to contend with 30 years or more ago, and it is only by commencing at the source of prodeduction that can ever hope to make the industry efficient.

In order to place the citrus industry in Australia on a sound and economic basis, I consider it desirable that the Federal Government, the State Government and/or the Industry should station a competent man in California for a period of not less than two years, in order that he could keep the industry in this country thoroughly conversant with every development taking place within the industry in the United States of America; that no further plantings of citrus be made except in proved localities; that growers and others associated with the industry take early steps to adopt the following practices:—

(*a*) In the selection of nursery trees to purchase only those which have been budded from selected trees on to sweet or sour orange stocks.

(*b*) To eliminate all off-type and non-profitable varieties.

(*c*) To plant efficient breakwinds.

(*d*) To apply heavy annual dressings of animal manures and nitrogen, and to grow cover crops.

(*e*) To apply lighter and more frequent irrigations, even if the additional cost has to be met by reduced cultivation or other means.

(*f*) To take drastic steps to eradicate all pests, particularly red scale.

(*g*) To prune the trees only lightly, but trimming out dead wood and all growth near the ground.

(*h*) That clippers, picking bags, and gloves be used in harvesting.

(*i*) That, where practicable, harvesting should be done by selected men under expert supervision.

(*j*) That gloves be used in the packing houses in all hand operations.

(*k*) That every effort be made to have interstate and export fruit transported in refrigerated rail vans under a speedy service, particularly during the spring and summer months.

Chemical Bandages for Codling Moth.

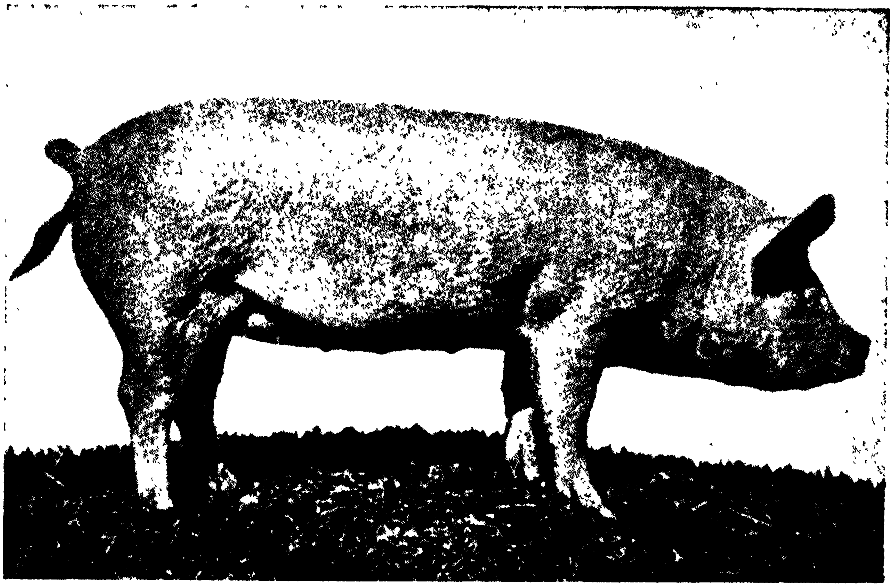
Seeking information as to the efficiency of chemical bandages for the catching of Codling Moth grubs, Mr. R. Fowler (Manager of the Blackwood Orchard) has advised the Secretary of the Beetaloo Valley Branch of the Agricultural Bureau that chemical bandages have been used at the Experiment Orchard during the past three years, and thousands of Codling Grubs have been caught in them. Put out in December, they remain toxic until the end of March, but if left till June, they may contain a few live grubs.

When used experimentally in conjunction with the ordinary bag bandages (with bag bandages a few inches above and below the chemical bandage), more Codlin Grubs were found in the chemical than in the bag bandages, seemingly indicating that the beta-naphthol used in chemical bandages does not act in any way as a repellant.

A slight oil mark remains on the tree after the chemical bandage is removed, but apparently no permanent injury results.

It can be definitely claimed that 50 per cent. or more of the Codling Grubs present in the tree and fruit will be caught and killed by the chemical bandage, and the cumulative effect should be a considerable reduction in the Codling Moth population in the Orchard after a few years.

Last season, 757 grubs were caught in 15 chemical bandages; an average of 50.47 per bandage, and up to 294 grubs have been recorded for one bandage.



The Ideal Bacon Type

Some Aspects in the Management of Pigs

Paper read at 1936 Agricultural Bureau Congress.

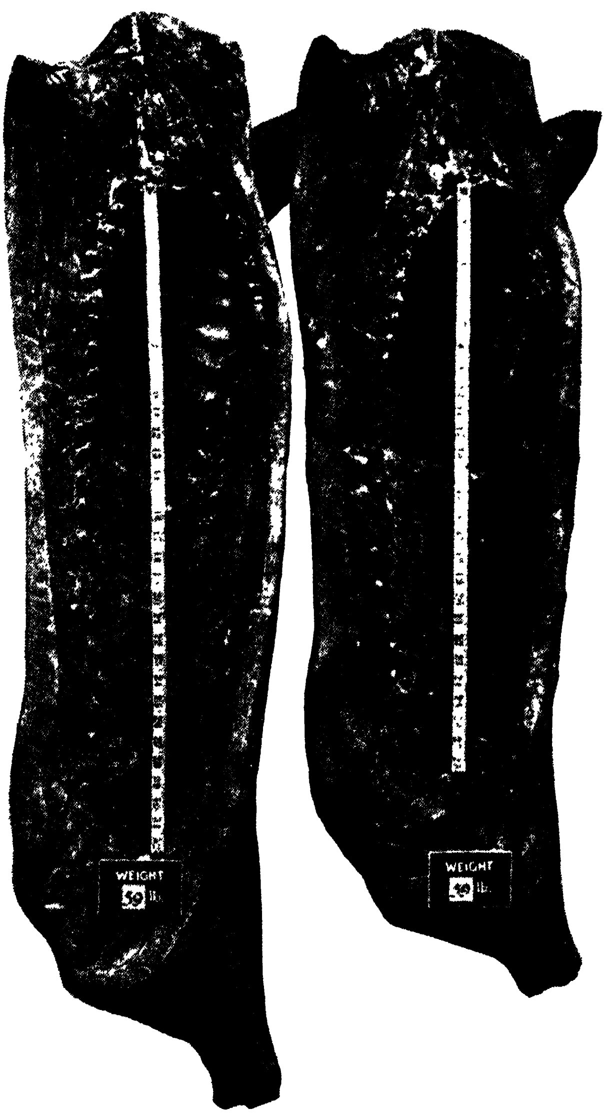
[R. Baker, R.D.A., Superintendent of Dairying, Roseworthy Agricultural College.]

INTRODUCTION.

Although it is the intention in this paper to deal with "Some Aspects in the Management of Pigs," it would be an oversight not to make some reference to the position of the pig industry of South Australia at the present time. The pig population of the State has been increased during the last two or three years to such an extent that local requirements cannot absorb all animals. With the surplus, South Australia is rapidly becoming an exporter of pig carcasses to the United Kingdom. By the disposal of our surplus in this way it has been possible to maintain prices on our local market at a reasonable level. Furthermore, Mr. R. G. Watson, the representative of the Australian pig industry on the Australian Meat Board, points out that with the production of sufficient pigs to maintain continuous and permanent exportable supplies local prices will be governed to a great extent by values obtained on the British market.

It is therefore our responsibility to see that this market is supplied with carcasses of a type that will demand highest prices. Unsuitable carcasses have very little trade value, they are difficult to dispose of, and then only at greatly reduced values.

The possibilities of a valuable pig exporting industry are very great when it is realised that the United Kingdom imports approximately £40,000,000 worth of pig products every year, the great bulk of which is supplied by foreign countries. Any advance in production and export in Australia, although proving a remarkable benefit to this country, would not have any great effect on the British market on account of the very small percentage that the increase would represent, compared with the total imports from other countries. Australia during the last year supplied approximately 1.7 per cent. of the total pig products imported into the United Kingdom, and as the production in Great Britain was equal to about half of her total imports, Australia's share of the English market was only about 0.8 per cent. It should be possible to share to a more marked degree in this enormous trade in pig products, providing we are prepared to have available a continuity of supplies of pigs uniform in weight and of a type suitable to meet the exacting demands of the modern butchers and bacon curers requirements.



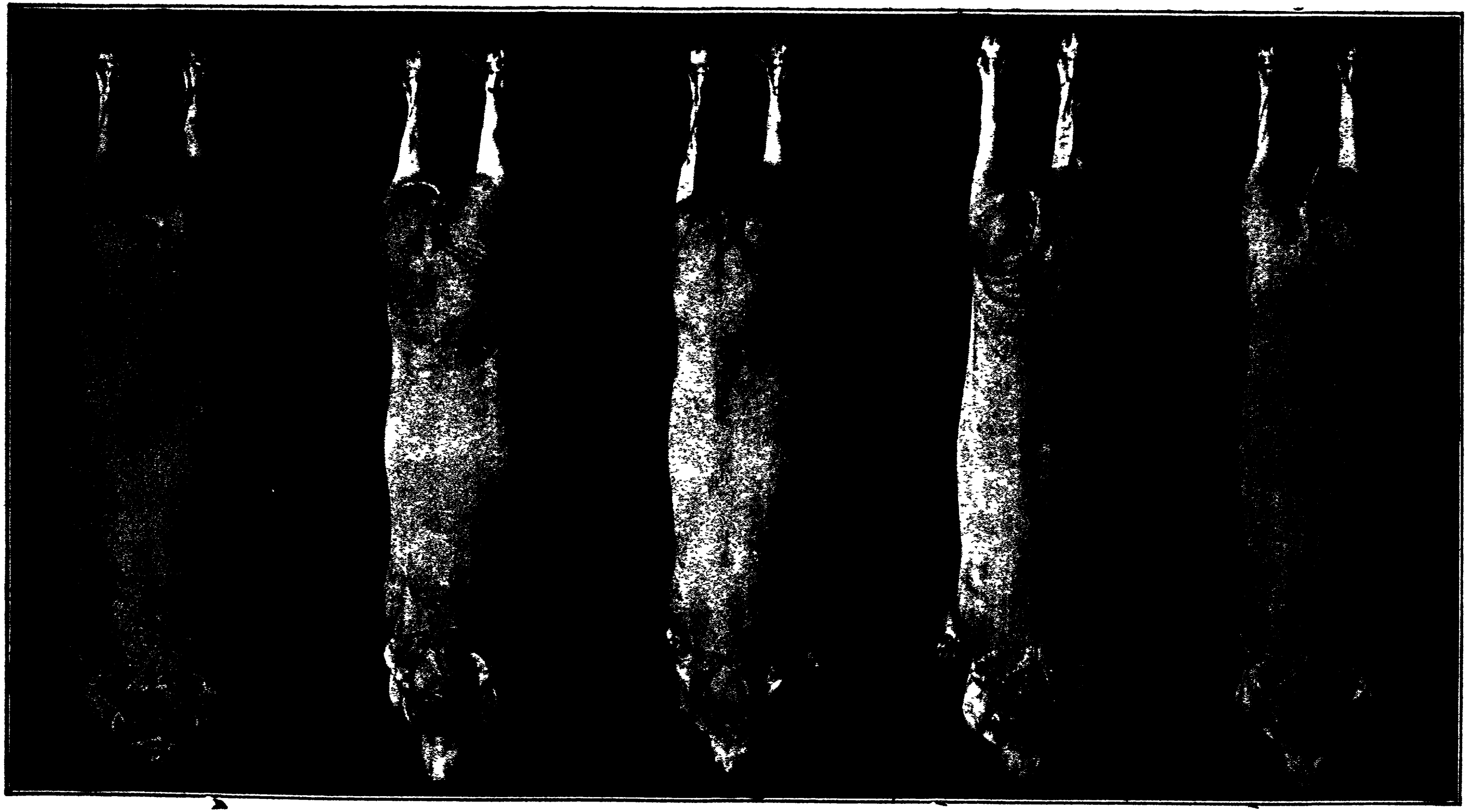
[*Pig Breeders' Annual*, 1931-32.

Sides of equal weight showing different length of middle. The side on the right is of low market value, being too short and thick and excessively fat, whilst that on the left shows a development of the valuable porker, the middle.

By adopting definite standards of breeding and feeding in order to compete with countries more favourably situated, or at least more advanced in the ways and means of exploiting export markets, South Australia should experience little difficulty in this direction. We have available correct breeds of pigs, and our farmers are capable of growing large quantities of barley and wheat, guaranteeing a supply of the most important basal foods, which with the judicious use of supplementary foods should make it possible to provide pigs in large numbers suitable for any market. South Australia is particularly fortunate, for over a great portion of the settled areas existing conditions are eminently suited to the breeding and rearing of pigs, the climate in the main is ideal, and owing to the fact that we are not subject to outbreaks of serious contagious disease, it should be possible with ordinary care and management to successfully bring to a marketable size a high percentage of the pigs born.

STANDARD OF TYPE.

Because of the public's fastidious taste for lean pork and bacon, England and Australia are facing similar problems in their pig productions. Both countries are blessed with too many breeds, which in the old days all had their particular virtues, but to-day are in many ways unsuitable for modern butchers' requirements. The short thick-set pig, broad of back, heavy in the hams, and carrying a relatively high proportion of fat, which was so popular a few years



1. 2. 3. 4. 5

CARCASSES OF VARIOUS BREEDING.

1. Old-time Australian Berkshire—unsuitable for export. 2, 3, 4, and 5 are suitable export carcasses. Long, narrow types (Large White and Tamworth) were used as sires, and the short, thick types (Berkshire and Mid York) as dams.

2. Large White-Berkshire. 3 Tamworth-Berkshire 4. Large White-Mid York 5. Large White on Tamworth-Berkshire.

ago, is no longer in favour. What is required is the long, lean animal that will provide a carcass carrying a wealth of lean meat, with just sufficient fat to ensure a high-quality product.

Type rather than breed is the important factor, for from a commercial point of view, pure-bred pigs are only better than other pigs when they breed maximum numbers of best market classes with greater uniformity. If breed characteristics do not conform to modern requirements their show-ring excellence has little if any value to the commercial breeder. Unfortunately, the scrapping of all unsuitable breeds, such as Denmark, Northern Ireland, and other countries have done to permit of the production of one particular breed or cross, cannot be undertaken, and consequently type must be evolved by a combination of breeds in existence. The type of pig which demands the highest prices overseas, is the long lean animal, light at the fore end, head, neck, and shoulder. moderately deep in the side, straight underline and developed hams, for preference white in colour.

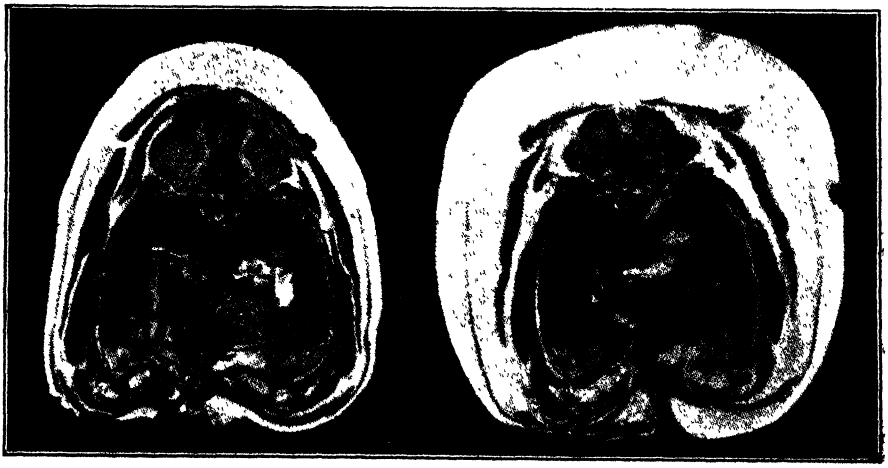
The question of colour is important, for in order to attract British buyers the carcass must be clean, well de-haired and white finished as possible. Dark skins, or dark patches on the skins will depreciate values. With the introduction of singeing, it is claimed that the dark-skin pigs can be made as attractive as those that do not show any pigmentation. That this is so is borne out in New Zealand where large numbers of exportable pigs are either Berkshire or Tamworth-Berkshire cross.

From reports, the quality of our pork sent overseas compares very favourably with that of other countries, and it is bought quite readily, but it would be a further advantage if Australia were to adopt definite standards and export carcasses more uniform in weight and type. Carcasses that will demand the highest prices are porkers dressing from 60 to 80lbs. and baconers from 140 to 170lbs.

Breeding Stock.

The Boar.

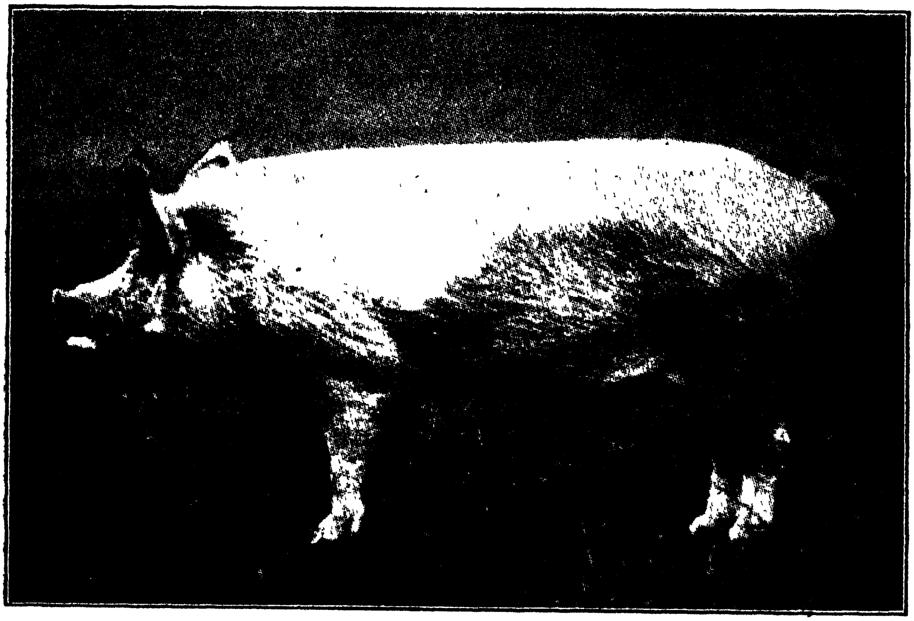
In the breeding of pork and bacon types, the selection of the boar is of the greatest importance, for on him depends the success or otherwise of all pigs one may have to fatten. As with all sires, the boar should be pure-bred and



Sections of carcasses illustrating an arched and a flat back respectively. An arched or rounded back indicates formation of the desired lean meat; a wide flat back is generally accompanied by excessive layers of fat.

of a strain that is capable of producing pigs in large numbers that conform to present day market classes; in other words, one that will give the greatest weight of lean meat at the most valuable cuts. All meat in front of the girth is of comparatively low value, so the less we have there the better, so long as conformation is consistent with constitutional development.

The boar should be masculine in appearance, light in the neck and shoulder, wide between the fore legs, and the shoulder compact, with the blade bones well set in. The back should be long and level or slightly arched, with the highest point just over the loins. Length is important, for it means the development of the most valuable portion. The slightly rounded back, as shown by the spring of the rib, means the absence of excess fat formation and a depth of loin; excessive fat generally accompanies a wide flat back. The ribs should slope gently from the backbone, dropping suddenly, giving a side that is level, flat, and moderately deep. The underline should be straight and well held up. Thickness and firmness of the flesh can be better estimated here than along the back; any distension is accompanied by thin belly cuts. The flanks should be thick and in line with the sides.



[*Pig Breeders' Annual*, 1935-36.

Large White Boar. Fineness of shoulder, length of body, and well developed ham are the main characteristics of a sire in the production of the best market classes.

The hams should be broad, wide, and deep to the hocks, as these characteristics denote plenty of flesh. The tail should be carried moderately high; a tail carried high and showing depressions in the ham is accompanied by heavy layers of fat at this point. Legs should be of moderate length, set wide apart, fine in the bone with a flattish appearance, the pasterns strong and upright, causing the animal to walk on his toes. Weak in-bent knees especially should be avoided, as they are often allied with heavy, coarse shoulders.

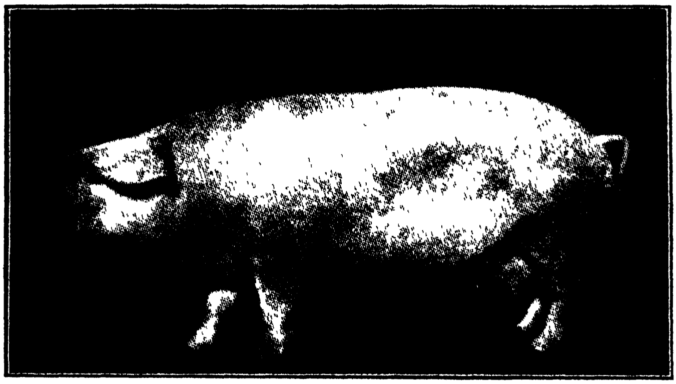
The skin should be free from coarseness and wrinkles, covered with a good coat of fine silky hair. Wrinkles denote coarseness, while hair is one of the best outward indications of quality of flesh.

The sexual organs should be well developed, as this implies constitutional vigour. Ruptured pigs, or a pig with only one testicle showing, should not be used, as these conditions are hereditary. It is possible to castrate ruptured pigs, but the animal with only one testicle is difficult to treat. An active, medium-sized boar, light in the forequarters and heavy in the hindquarters, will generally remain fruitful longer than the heavy-shouldered coarse-boned boar.

It is not possible to fairly judge a boar just weaned; the power of the digestive functions is unknown at this period. His disposition, ability to put on flesh, capacity for breeding and prepotency can only be estimated after the birth of several litters.

The Sow.

The selection of the sow is of almost as great importance as that of the boar, as both sire and dam contribute equally in the production of the offspring. This is illustrated in crossing the Large White with the old-time Berkshire; though an improvement in length is noticed, it is often accompanied by thickness of shoulder.



[*Pig Breeders' Annual*, 1935-36.

A Danish Land Breed (Landrace) Sow. Length and roominess of body are essential in a breeding sow.

The head, neck, shoulder, and bone should be finer than in the boar, but apart from these characteristics, the description of the boar will apply to the sow.

The sow, like the boar, should be selected from a prolific mother, as fecundity is hereditary. The number of teats should be at least 12, fully developed and active, set wide apart, even in size, with the front teats well forward along the chest. Although the number of teats does not indicate the number of pigs she is likely to have, it is an indication that she will be able to rear a large litter. In selection, extremes should be avoided. A rough long neck, narrow chest, and long coarse legs characterise a slow feeder, an undesirable quality in the production of bacon pigs. The carcass of such an animal is deficient in lean meat, contains too much bone, with a result that there is too great a loss in secondary offal. The short, thick-set type is also undesirable.

General Management of the Sow.

The sow requires less control than most breeding animals. This is a fortunate circumstance, as there are few animals less appreciative of interference than the farm sow. From the time she first goes to the boar until her breeding days are over she is regarded simply as a reproductive machine, which must be maintained in moderate flesh only, so that she may perform her stud duties more thoroughly. Her life may be divided into three periods:—(1) Mating period; (2) period of gestation; and (3) farrowing and suckling period. Normally, these periods will occupy from 6 to 7 months, so that when all goes well she is able to complete the cycle twice every year, and at the end of her period of usefulness as a breeder she is fattended and ultimately sold as a back-fatter.

The management of the sow resolves itself into the problem of stimulating to the fullest extent the pro-creative and maternal functions without injury to constitution and general health.

Mating Period.

Owing to early sexual development, young sows intended for breeding purposes should be separated from boar pigs not later than three months old. During their growing period, before they are required to breed, they should be allowed to develop the best possible frame under natural conditions, without becoming over-fat. The question arises as to what age should they be mated in order to obtain maximum results. The immediate advantage of early mating is insignificant, as it is generally followed by small, weakly litters, often accompanied by difficult and dangerous parturition. Time is not saved, for the development of the young mother is interfered with, and she may be less capable of producing profitable litters during what should be her best breeding period, especially if she is forced to produce two litters each year.

There are, however, equally convincing reasons for avoiding the mistake of breeding too late. Young sows are particularly good doers, and may become too high in condition for breeding animals, with the result that maternal instincts are less acute, followed by a difficulty to get them in pig; and when they do breed they generally produce small and unprofitable litters. It appears that the best results under our conditions are obtained when sows are allowed to drop their first litters at approximately 12 months.

Mating.

Unrestricted service is not recommended. The possibility of accidents to either animal is far too great; also we know that sows remain "in season" for two or three days, and that the oestral cycle is from a fortnight to a month, generally 21 days in duration. It is a reasonable supposition, therefore, that by permitting unlimited service where the number of sows in a field ranges from 15 to 20 there is a danger of the generative glands being drained to such an extent that the boar's fertility is seriously, if not permanently, impaired.

The sow should be turned in with the boar about 24 to 36 hours after the first appearance of oestrum, and removed, after one complete service, to a sty or small yard, where she may be kept quiet until the period of "heat" has passed; then turn her out with other brood sows. The practice of mating at the beginning and again towards the end of oestrum has no particular advantage, providing the one service is complete and satisfactory. By allowing the boar to serve 24 to 36 hours after the first appearance of "heat" is said to have an important influence on the size of the litter, due to the presence of the maximum ova or seed in the fallopian tubes. Mr. R. B. Kelley, B.V.Sc., in the "Pig Industry," points out that at service there are normally millions of spermatozoa or seed of the boar, but relatively few ova; the sow is therefore responsible for the size of the litter in any particular generation. By taking advantage of serving the sow when the maximum ova are present the possibility of larger litters is apparent, provided other conditions are normal.

It is the practice in some piggeries to allow "in pig" sows to run in the same paddock with the boar. This procedure has its advantages; it provides company for the boar, and there is little danger of any interference; also, dry sows are maintained in the best of health at a minimum cost; it also reduces the labour round the piggery to the lowest possible figure.

Period of Gestation.

There is no means of determining immediately whether mating has been followed by conception, but generally speaking a decision can be arrived at by the end of the third week, by the absence of signs of "heat." In addition, other important signs may be noticed, particularly a decided aversion to the companionship of the boar, the sows become quieter and slower in their habits and movements, and they tend to lie about more as farrowing approaches. The tendency to become quieter is accompanied by an improvement in condition, due no doubt to the stimulating influence of pregnancy, but when the udder shows signs of active development sows generally go off a little in condition. At the seventh or eighth week there should be no difficulty in determining the results of mating; there is a distinct enlargement of the belly and a swelling of the udder.

The period of gestation varies very little with the normal sow, which will usually farrow on the 112th day after service; old and weak sows may farrow a few days before, while those that are strong and vigorous may go a day or two over.

Management of a Sow during Pregnancy.

Sows in pig require a minimum of attention during the early stages of gestation. The best and cheapest practice to follow is to have them grazing on grass, with the addition of a minimum of grain, keeping them in a thrifty condition, avoiding the extremes of poverty and high condition. Greenfeed, during this, as well as at other periods throughout the life of the pig, is of the utmost importance, it not only supplies the necessary food constituents for the development of healthy youngsters, but regulates the bowel and prevents constipation.

The under-feeding of a sow while carrying a litter leads to the birth of ill-nourished, weakly pigs, and an inadequate supply of mother's milk, a loss which it is almost impossible to repair. Further, the suckling period will be greatly reduced, giving the young pigs a check which will be difficult to rectify during the remainder of their existence.

Beyond regulating their condition, and providing plenty of shelter and clean drinking water, no other treatment is necessary until the sow begins to "spring." A week to 10 days before farrowing she should be placed in a special farrowing pen fitted with a protecting rail and connected with a small yard for exercise. A supply of short straw is given for bedding. The amount should not be excessive, otherwise losses occur through the youngsters becoming buried and accidentally suffocated.

Before sows are allowed to occupy the farrowing pen it should be thoroughly cleaned out and disinfected as a precaution against disease and worm infestation, for wherever pig manure has been lying or wherever pigs have been up to 12 months previously, there is risk of infection. Suckling pigs may swallow embryo worms which have adhered to the teats and udder of the sow, or they may pick them up through nosing on the ground, in food, or in water. It is also advisable to pay special attention to the cleanliness of the sow, particularly the udder and teats.

By bringing the sow into the farrowing pen about a week before parturition there will be ample time for her to become acquainted with her surroundings, and to settle down before the delivery of the litter; also an opportunity to correct any bowel disorders that may be brought about by a change of diet.

Light, easily-digested food should be fed in small quantities, the ration being continued for two or three days after farrowing, when the sow can be given more solid food. If constipation be observed, some laxative food such as bran may be added to the ration, or 2ozs. of castor oil given in warm milk. Many troubles at parturition are caused by neglecting this precaution.

Signs of Farrowing.

Approaching parturition is preceded by a swelling of the teats and milk glands, an enlargement of the vulva, and a relaxation of the muscles on both sides of the tail. The appearance of milk in the teats is interpreted to mean that farrowing may be expected within 24 hours.

Parturition or Farrowing.

The less interference at the time of parturition the better for mother and offspring, for when sows have been properly managed during gestation trouble is seldom experienced. Normally labour pains, which are slight at first, gradually become more violent, leading to the expulsion of the litter without the least difficulty.

When the sow is inclined to be restless and the danger of lying on the youngsters is apparent, they should be removed on arrival, and placed in a warm box until farrowing has been completed; then carefully place them back on the sow. As a rule the placenta or afterbirth will come away shortly after the last pig; it should be promptly removed and either buried or burnt.

Should difficulties be noticed and assistance required it should be given without loss of time, as obstructions to free birth are difficult to remove in animals of this size. By evacuating the bowels and making use of both the alimentary and genital passages the operation may be carried out, but in more difficult cases individual ingenuity must be relied upon. When assistance has been given and the youngsters are near the point of exhaustion a teaspoonful of weak spirits and a little milk will generally revive them.

When a sow over-farrows, that is, produces more pigs than she can properly nurse, the weaklings should be either destroyed or transferred to a foster mother with a short litter. With maiden sows or yelts it is advisable to allow them to suckle as many as possible within reason, in order to develop the udder in preparation for subsequent litters. The first litter of a maiden sow is rarely an indication of the number she is capable of producing; this is generally determined by the second or third litter, which should give sufficient information to judge whether she will be a successful breeder or not.

After farrowing the ration should be light, easily digested, and palatable, giving at first only small quantities, gradually increasing the amount until on a full ration. Skim milk, barley, pollard, and greenfeed are useful, always fed in a clean condition, avoiding foods likely to cause constipation, aiming to produce an adequate supply of milk during the suckling period. The class of food supplied to the sow is quickly reflected by the condition of the litter.

Feeding and Management of the Sucker.

Generally speaking the young pigs will be fully satisfied with the mother's milk for the first week. If anything serious should happen to the sow whereby she is unable to properly suckle the litter, they can be reared by the addition of warm cow's milk to which a little sugar has been added, the amount of sugar being increased if constipation is evident, and reduced should the bowels become unduly relaxed. The milk should be given warm and in small quantities 4 or 6 times a day, while all feeding utensils should be kept perfectly clean.

With ample shelter and shade available, no better conditions in our warm climate can be provided for the rearing of a litter than the use of a small grassed run, for sunlight, exercise, and greenfeed are essential factors in promoting healthy growth. When the youngsters are able to look after themselves they should be turned out with the sow from the farrowing pen.

When about three weeks old young pigs will begin to select food for themselves and will benefit if the dam's milk is supplemented with some easily digested food, and for the purpose nothing can surpass a mixture of skim milk and pollard or finely crushed grain. Only small quantities are required at first, gradually increasing the amount as the pigs develop.

Food is given in small enclosures away from the sow, all troughs and buckets being kept perfectly clean. Any food remaining in the trough after the youngsters have fed should be cleaned out, for surplus food is liable to become sour and contaminated, causing digestive troubles.

Generally speaking, by feeding the suckers during the suckling period they learn to become independent of the mother, so that at about eight weeks they can be weaned without experiencing any setback. It is the practice on some farms, when skim milk is not available, to allow the young pigs to remain with the sow until they are from 11 to 12 weeks old, in order to provide better growth at weaning, but it must be remembered that by following this practice time is lost, and it would be impossible for a sow to rear two litters each year.

All young boar pigs, when not required for stud purposes, should be castrated at about four weeks.

Feeding Pigs.

Feeding and type go hand in hand in the production of high-class pork and bacon; it is not possible without a combination of these two factors. Best specimens of bacon-type animals, when fed solely and heavily on fattening food, show a tendency to become shorter and thicker in body, due to an excessive accumulation of fat. On the other hand, no matter how much care is exercised in feeding, it is not possible to produce an ideal baconer from a type that is naturally short and thick. This type should be marketed as early as possible as light porkers, for it seldom pays to feed them to a bacon weight.

Under the modern system of management, which does not recognise the necessity for the store pig stage in the production of pork and bacon, weaners enter the fattening process immediately they are separated from the mother. The right condition is then developed by careful feeding, and best results are obtained by allowing the youngsters plenty of freedom and exercise until they are getting close to market weights.

For economic feeding the ration would vary in accordance with foods produced on the farm and the relative values of such feeds as are being offered for sale. The great bulk of the pigs in South Australia are fattened on barley. Wheat, pollard and pease are also used, while the supplementary foods consist mainly of dairy by-products, green feed and meat meal. There is no single article of diet which in itself constitutes a complete or balanced ration, and usually it is uneconomical to attempt to grow pigs on any one dairy by-product or farm crop. In order to utilise the different foods to the best advantage the ration should consist of a combination of two or three ingredients. In compounding rations to provide a wealth of lean meat in a carcass, it should contain a relatively high proportion of flesh-forming matter or protein. The composition of our important basal foods, barley and wheat, show the percentage of protein to be comparatively low and insufficient to bring about the production of an ideal carcass. It is therefore necessary that they be fed in conjunction with foods that are rich in this all-important constituent, such as skim milk, butter milk, green feed, pease and meat meal.

Feeding for the Production of Pork.

From observations and the result of feeding trials carried out at the College, the following rations are suggested as being appropriate for feeding at different stages during the development of the pig from a weaner to a baconer. Green feed is given with all rations, and wherever possible in the form of lucerne.

Age.	Ration.
3-12 weeks.—	A mixture of skim milk and pollard, with the gradual addition of a grain mixture of barley or wheat 16 parts, pease four parts. When skim milk is not available substitute 1½ parts of meat meal.
12-18 weeks.—	Barley 12 parts, pease three parts, skim milk one to three parts by weight with grain. When skim milk is not available substitute one part of meat meal.

Ration—*continued.*

18-24 weeks.—Barley 12 parts, pease four parts, skim milk one to three parts by weight with grain. When skim milk is not available substitute 1½ parts of meat meal.

Quantity of Food Required in Feeding.

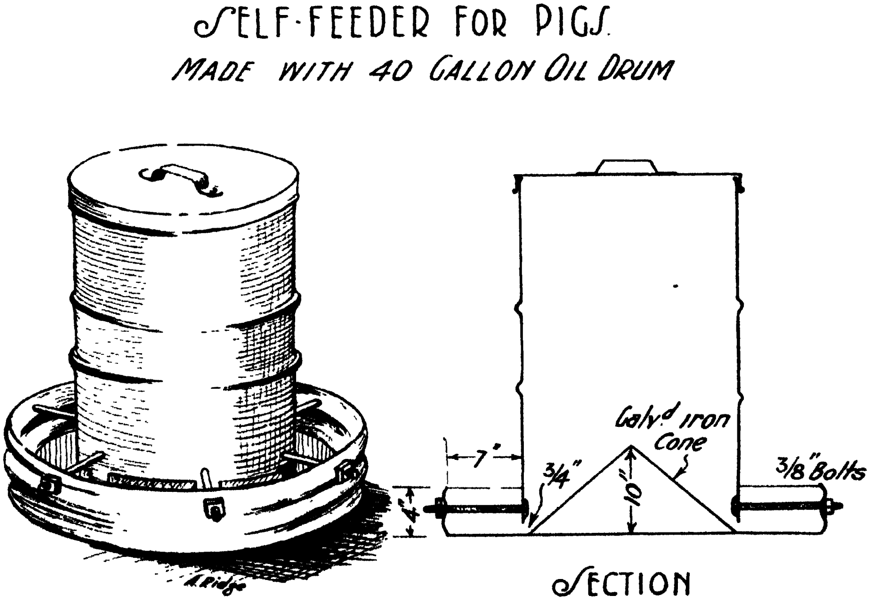
The quantity of food required by a growing pig will depend largely upon its size, and this can be gauged approximately by its weight. Generally speaking a growing pig will need about 1lb. of mixed meal for every 20lbs. of live weight. On this basis the following table has been drawn up:—

Age.	Approximate Live Weight. Lbs.	Total Meal per Head per Day. Lbs.
3-12 weeks	20- 50	1 -2½
12-16 weeks	50- 80	2½-4½
16-18 weeks	80-120	4½-6
18-20 weeks	120-170	6 -7½
20-24 weeks	170-200	7½-9
Sows in pig		2-4-6
Suckling sows		8-10-12
Boars		3-5-7

The suggested rations and quantities of food should only be regarded as guides in building up of a ration. Certain foods may not be available and would have to be substituted by others. It is quite possible also that breeders and feeders can quote higher weight secured with less liberal diet; exceptional cases are not being dealt with. Good pastures, particularly clover or lucerne, are very helpful in producing good bacon carcasses, but excessive succulent food and little grain will produce soft bacon. For choice bacon, however, pigs are usually fed less concentrates than what might be termed a full ration.

Self-Feeders.

When large numbers of pigs are to be fed, self-feeders are essential in keeping down feeding costs. The different ingredients of a ration should not be fed free choice, but in the form of a mixture, for the relative unpalatability of one food to another would probably mean the excessive consumption of a high price



A simple self-feeder for pigs, constructed from a 40gall. oil drum and galvanized iron.

supplement. For lean pigs the self-feeder may be used throughout practically the whole of the developing period, but breeds or crosses that are likely to become over fat should be fed from troughs until being "finished" for market. Self-feeders should have the following qualifications:—(1) Should protect the food from climatic conditions, birds and vermin. (2) It should be possible to regulate the supply of food so that it will run slowly from the hopper and not accumulate in the trough. (3) It should be easily movable. (4) It should be as simple as possible in construction. (5) It should be durable, not easily damaged, moved or upset by pigs.

Foods.

Barley.

Of the different foods available for the feeding of pigs, the most important to the South Australian farmer is barley. It can be grown in large quantities at a comparatively cheap price. Barley is not a complete food, being deficient in protein, and when fed alone there is a tendency for the animal to lay on fat. When judiciously used with supplementary foods rich in protein, it provides a product that for firmness, whiteness of fat, and denseness of lean meat is hard to fault.

Wherever possible barley should be fed with skim milk and greenfeed, for preference, lucerne. That the value of barley is increased by the use of these two foods has been illustrated in a feeding trial conducted at the College. With barley at 2s. per bushel pigs fed on this grain alone returned a value of 2s. 10d. per bushel, while those fed barley, skim milk and lucerne, after deducting the value of the skim milk and lucerne, returned a value of 3s. 9d. per bushel. The values were estimated on an average price of 5½d. per pound of pork.

Wheat.

When prices are low, wheat can be fed to pigs with gratifying results. Shrivelled or second-grade grain can be disposed of to advantage by feeding it to pigs. Like barley, wheat is deficient in protein, and in order to provide a balanced ration it would have to be fed in combination with other foods in a similar manner to barley. When a ration consists mainly of wheat, pigs become over fat and the fat is inclined to be soft. Best results are obtained when wheat is coarsely ground.

Pollard.

An excellent food for pigs at all ages, and for all purposes, especially for the feeding of young pigs that have been recently weaned. It is almost a complete ration, but for pork or bacon it is best fed in conjunction with barley and skim milk, for it has the reputation of producing a bacon inclined to be soft when fed alone.

Pease.

Pease are comparatively rich in protein, consequently of particular value in the production of lean bacon. Fed whole they are very palatable, but a big percentage is wasted, passing through the system without being wholly digested. Pea-meal is a valuable feed, but should not be fed alone, particularly to young pigs. Its close, heavy nature renders it difficult to digest, and pigs are apt to sicken. It combines well with barley and wheat, and may constitute 25 per cent. of a ration.

Dairy By-products.

Skim milk is one of the most valuable foods fed to pigs; it can be used with excellent results at all ages. It not only has the ability, when fed with grain, to produce an excellent quality carcass, but also leads to a better assimilation of all ingredients of a ration. Feeding trials carried out in Denmark in recent years have shown, beyond any shadow of doubt, that the flesh of pigs that have been given suitable quantities of skim milk has gained the highest number of points for colour and flavour; in fact there was scarcely ever anything wrong with the quality of the flesh.

Sufficient advantage does not appear to have been taken when skim milk is available for feeding, for when fed with grain in very small quantities, remarkable returns have been made. This is said to be due to assessory factors of some kind, and that small quantities are as effective as large quantities. In a feeding trial being carried out at the College at the present time pigs fed with barley showed a mean daily gain of 1.11lbs., while others fed with barley and skim milk, at the rate of 1lb. of milk to 1lb. of grain, returned an average gain of 1.71lbs. per day. Feeding larger quantities does not show a proportionate increase.

Butter milk, provided it has not been diluted with water, has practically the same feeding value as skim milk. Whey is not as valuable as skim milk when fed to pigs; its protein content is low and when fed in large quantities it affects the thickness of belly cut in the baconer.

Meat Meal.

Extremely rich in protein and mineral matter, meat meal provides a means of balancing a ration consisting mainly of basal foods, barley and wheat, and when necessary can be used up to 10 per cent. of a ration. Best results are obtained when it is fed with greenfeed.

Green Fodder.

Green feed is characterised by its ability to tone up the system, and provide food for muscle development, and, wherever possible, should be fed to pigs of all ages. Like skim milk, it contains accessory food factors, or vitamins, necessary for the assimilation of foods and minerals. It is difficult to suggest any food that can effectively take the place of green feed, except perhaps lucerne or clover hay, which, when soaked in water, will make a reasonable substitute.

Minerals.

The absence of minerals leads to unthriftiness and the occurrence of such diseases as paralysis and rickets, so that in order to encourage healthy growth the food must contain supplies ample for their needs. Our Veterinary Department states that the only mineral constituents that are likely to be lacking to any extent in rations fed to pigs are lime phosphates, and common salt, and to provide the necessary minerals they suggest the following mixture:—Ground limestone or agricultural lime, 2 parts; bone meal or dicalcic phosphate, 2 parts; common salt, 1 part; used at the rate of 2½lbs. per 100lbs. of grain.

[*Pig Breeders' Annual*, 1935-36.

A simple type of outdoor shelter.

Value of Shelters.

The value of shelters should not be lightly considered for providing efficient protection against the cold of winter and the heat of summer, enables the growing pig to utilise food to a better advantage. A certain percentage of food consumed is used to maintain body heat. If ample shelter is provided and the pig is kept warm, this food is then used for the production of meat. In shelters where it is very cold, either because the temperature in itself is low, or because the radiation of heat from the pigs is too great on account of the materials of which the floors and walls are built, the fat of pigs will be softer than in warm shelters. The pigs' health to a very marked degree depends upon the efficiency of the shelter provided, and quality of bacon most of all upon the state of health of the pig.

Conclusion.

In conclusion, it is necessary to emphasise that it is essential that if Australia is to become a successful exporter of pigs' carcasses to the United Kingdom we must adopt definite standards in breeding and feeding in order to provide pigs that are uniform in weight and of a type that will meet the exacting demands of the British market. Also, by the careful selection and management of breeding stock, with due consideration for the health of the animal, a high percentage of the pigs born can successfully be brought to maturity. With such breeds as the Large White, Tamworth, and Canadian type Berkshire available for crossing, or even straight breeding, it would be possible, with vigorous selectivity, for South Australia to give British buyers the type of pig they demand.

Should Eggs be fed to Pigs?

The Green Patch Bureau asks, "What is the feeding value of eggs when fed to pigs?" Mr. W. J. Spafford (Director of Agriculture), replies as follows:—It is an unheard-of method of feeding pigs—to give grain to fowls to be converted into eggs and then give the eggs to pigs to be converted into pork, whereas the grain fed to pigs with a by-product such as skim milk or meat meal will make pork direct. To arrive at the theoretical value of eggs as a food-stuff for pigs is almost impossible, because no investigational work has been carried out in this direction, and none of the food-stuffs ordinarily given to animals are of a similar character, so that no reasonable comparison with proved food-stuffs can be made. New laid eggs contain 66 per cent. water, 12.8 per cent. protein, 10.6 per cent. fat, 10.6 per cent. ash, and the only food-stuff freely used with an analysis anything like this is fresh lean meat, but besides containing less water, meat also provides some carbohydrates and fibre.

Although fresh meat and eggs are not strictly comparable, they should re-act in a somewhat similar manner when used as part of a ration for pigs, and after making allowances for the differences in moisture content and minerals, it might be taken as a rough approximation that 5lbs. of fresh lean meat are equal to 5 dozen new laid farm eggs.

Barley—Its Rooting System.

Mr. W. J. Spafford (Director of Agriculture) in reply to a question asked by the Sutherlands Branch of the Agricultural Bureau as to the difference of rooting systems of Barley and Wheat, says:—Six rowed barley and wheat have rather different root systems in that barley has a lot of feeding roots near the surface, and a few strong moisture-collecting roots which penetrate to fairly considerable depths, whereas most of the principal roots of wheat tend to go downwards rather than in a horizontal direction.

The root system of Six-rowed barley is such that the plant is really drought resistent, and grown on similar conditions and with equal treatment to that accorded to wheat, barley proves hardier than wheat.

Unfortunately the term Cape Barley is used in South Australia to include all of the very numerous varieties of Six-rowed barleys, and there is just as much difference between these varieties as there is between varieties of wheat. There is, however, no doubt that most Six-rowed barleys would do better than wheat in districts with about 10in. of average rainfall, if equal care was bestowed on each kind of cereal.

The Importance of the Export of Wine to South Australia

Paper read at 1936 Agricultural Bureau Congress.

[By B. W. BAGENAL, Emu Wine Co. Pty. Ltd.]

Values of gross output of various industries (1934-35):—

Wineries and distilleries	**£1,853,104**
Butter, cheese and bacon	**1,253,871**
Grain milling	**1,219,671**
Breweries	**390,134**
Dried fruit, jam, canned fruit and vegetables	**217,006**

In order to get a full understanding of this subject some study of wine, how it is made, and its various classifications, is advisable and even essential.

How does the grape become converted into wine, an alcoholic beverage? You have all observed the beautiful bunches of ripe grapes, whether purple in colour (black grapes as they are generally called), or white. These beautiful grapes—when unsoiled by rain, bad weather, or travel—are covered with the beautiful bloom. This bloom was discovered by the world-famous scientist, Monsieur Pasteur, to be the germ of fermentation.

Where does it come from, and what is its action? No one knows where it comes from, except that at some period during the growth of the bunch it is deposited from the air upon the berries and lies there until the bunch is ripe.

Pasteur tried the experiment of placing the newly set bunch, just after blossoming, in a bag made of cotton wool—which is a germ filter. Bunches ripened under these circumstances and when smashed up under antiseptic conditions (that is, in such a way that no yeast germs could reach the juice) refused to ferment. He then carefully peeled the skins off grapes which had bloom on them, and this juice would not ferment. However, upon the introduction of the bloom, fermentation immediately set in.

Now fermentation—just what does this mean? Just as we eat food and transform part of that food into blood and tissue on the one hand and excreta on the other, so does wine yeast consume the sugar in the juice of the grape and convert it about half and half into alcohol and carbonic acid gas, which froths off and blows away. Wine yeast is elliptical in shape, but in growing becomes first of all elongated, then takes a figure of eight shape, then breaks into two cells, each of which begins all over again and so on; the one which has become two becomes the parent of billions of germs which, when they die, sink to the bottom of the vat or cask of wine with particles of colouring matter, crystals of cream of tartar and other matters which go to form what we call the "lees" of wine. So long as there is any sugar left unconverted, the yeast is anxious to be at it unless there are deterrent factors.

Varieties of Wine.

There are many of these, red in colour, white, and also what is known as tawny, *i.e.*, the colour of brown Spanish onion peel.

We have, however, regardless of colour, two main divisions:—

A. Unfortified wines

B. Fortified wines

Both of these classes may again be subdivided, but before entering upon this I must explain to you the meaning of the word "dry" in connection with wine, which is a liquid, as this is an enigma to many very well educated folk. A dry wine is merely a wine in which all the sugar has been converted into alcohol and carbonic acid gas—as I have said above, the yeast converts the sugar with these substances about half and half, *i.e.,* as to 99.5 per cent. the remaining 0.5 per cent. of sugar (or thereabouts, according to soil variety, &c.) being turned into glycerine, succinic acid and sundry other minute substances which help to create the bouquet and flavour so agreeable in good quality wines.

Well, to get on: we now can subdivide Group A into the following three main divisions:—

White: Hock, Chablis, Sauterne and Graves.

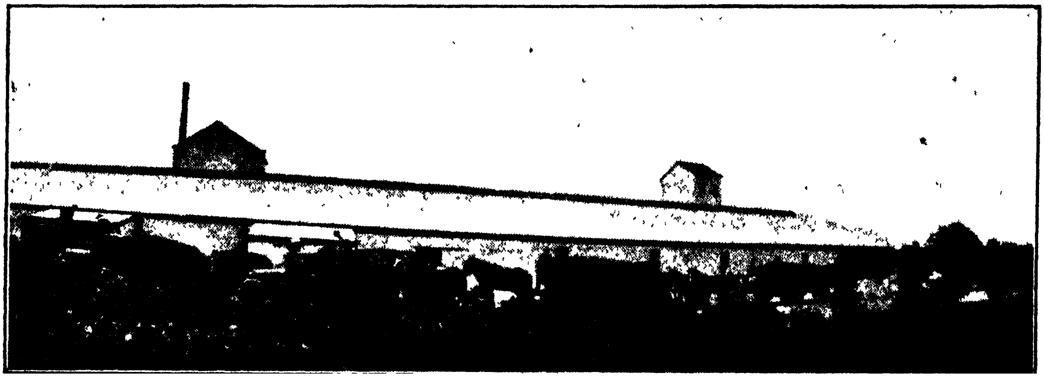
Red: Vin Ordinaire, Claret, Burgundy.

Sparkling: Both red and white.

Hock, with which we may also class Moselle, comes from the banks of the Rhine, and Moselle from those of the river of that name. These wines are generally rather high in acidity, and require a cool climate either in a latitude further from the equator or a high altitude and lighter soil and moister climate for their production.

Chablis is not nearly such an acid wine and is generally of a somewhat richer colour and is rounder, and in winter a more agreeable wine to drink. Both of these wines are essentially dry wines.

The Sauternes are quite far removed from either of the above, as they contain quite an appreciable percentage of sugar. This remains in the wine unconverted, because in the process of manufacture the wine has been filtered and filtered and filtered again and again until all the yeast germs have been removed and fermentation therefore ceases. The wine is then charged fairly heavily with the fumes of burning sulphur to prevent a re-infection. It is an extremely expensive and difficult wine to make, and is not seen so much in the trade on that account.



Delivering Grapes to a Winery.

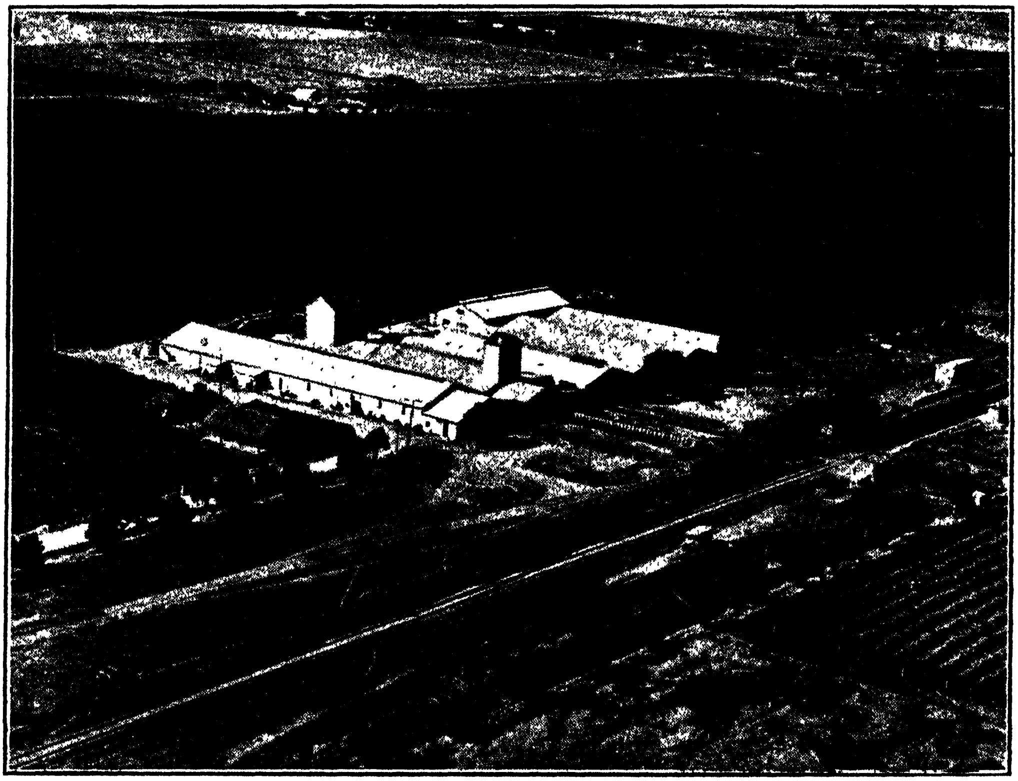
Vin Ordinaire is the universal beverage of the French—indeed of all the Latin races—and in France is very cheap indeed.

Claret and Burgundy denote wines of quality. The former comes from Bordeaux and the latter from the Burgundy district, about 100 miles south-east of Paris.

Sparkling Wines are both red and white. Sparkling Burgundy is red, Champagne, Sparkling Moselle and Sparkling Hock are all white—in that order of merit as a broad rule. Many years ago a monk happened to put away in a bottle some wine which had not finishing fermenting. The process went on and one day a cork was blown out, and lo! and behold! the resultant wine was fizzy and agreeable, and the old monk liked it. From that discovery the process of making Champagne has elaborated. It is too long to explain here, but let it suffice to say that a bottle of Champagne is handled about 200 times before it reaches the dinner table—hence its price!

We will now get on to Division B.

These wines are all fortified with spirit, that is, alcohol distilled from wine. They are very broadly subdivided as Sherries and Ports. With these there are sundry "allied" types, such as Marsala from Sicily, Tokay from Hungary, Madeira and others which may be included.



An aerial view of a Wine Cellar with surrounding Vineyards in a district south of Adelaide.

Sherry is always a white wine, but may be dry or sweet, with a multitude of subdivisions.

Port can be White, Tawny or Ruby, and is practically always sweet.

With these explanations I can now pass on to the subject of my paper, "The Importance of Our Export of Wine."

The export trade was begun actually in 1868, without however, any result worth while. It went on through the seventies and was becoming established in the eighties. At that time the duties in England were a shilling a gallon on all wines containing under 30 per cent. of proof spirit and half a crown on all those over 30 per cent.

The merchants of those days (there were only two in the business) who imported our wines to England were unable to gain a footing at all with our fortified wines, and found great opposition to the Burgundies. We had no Clarets to offer; speaking generally our climate does not produce Clarets very readily, as they need light soil and cool conditions like the Hocks.

French Vin Ordinaire (of which the vineyard hand's allowance is a quart a day) contains 14 per cent. of proof spirit, Claret 16 to 18 per cent., and Burgundy 18 to 20 per cent.

On the other hand, due to our dry warm climate, Australia produces a much more robust type of Burgundy, containing 24 to

26 per cent. of proof spirit which keeps much better for a few days when once the bottle is opened, whereas the French article must be consumed at once, as it tastes horrible even a day after the cork has been drawn.

So a market was worked up for "Australian Burgundy" which very gradually rose from very small proportions in 1880 to an annual sale in England of about 820,000galls. in 1914—34 years afterwards. Practically the whole of this went to four firms, Messrs. Burgoynes, the Emu Wine Company (then owned by the Pownall family), Messrs. W. and A. Gilbey and Stephen Smith & Co., but the first two must have the credit of having done the pioneering work.

This section of a Wine Storage Cellar represents a storage capacity of over 45,000 gallons.

Then came the war, and shipments had to be restricted, and by 1918 supplies were so short in London that the above-named firms were only supplying one bottle for every 12 ordered!

Then came peace, and with it we found ourselves at this end denuded of oak staves from which to manufacture casks in which to ship supplies—Australian hardwood which has since come into use to a certain extent as substitute was then unknown in the coopering trade. The Burgundy trade had therefore to be re-won at considerable cost, with labels, corks, bottles, freight—in fact, every item costing about 5 to 2 on pre-war costs.

Meanwhile our men had been coming back and had to be repatriated and employment found for them. New South Wales at Griffith, Victoria at Red Cliffs and Merbein and South Australia at Berri and elsewhere, had settled hundreds of men on irrigated areas growing Dorodillas only fit for distillation wine, and Gordos, Sultanas and Currants to be dried, for all of which market had to be found. The area under wine grapes thus rose from 18,000 acres in 1916 to 30,000 acres in

1926, and the production of wine rose from under 4 millions of gallons in 1916 to over 13 millions in 1926.

The wiser heads among the proprietary wine-makers began to look to the future with very grave misgivings, and in 1924, after sundry negotiations, the Federal Government passed a law giving a bounty on the export of sweet fortified wines with the idea of helping the Dorodilla growers out of their dilemma by using up the spirit made from these grapes. This was 1st September, 1924.

During the summer of 1924, Mr. Baldwin's Government, which was strong for Imperial preference, was thrown out and a Labour Government came in—entirely opposed to Imperial preference which was then pronounced in England (I was there at the time) to be as dead as the dodo and postponed for at least 20 years! I returned to Australia about the 1st October, 1924, and found the new Act had been passed while I was on the water. The Act was found to be useless, as the bounty was insufficient to enable London merchants to compete with Portugal and Spain without a preferential duty.

Then came the famous Zinovieff letter—the Zinovieff who has just been executed. I do not remember what he wrote, but I do know that it caused such a revulsion of feeling in England that Mr. Baldwin's Party was returned to power about 28th November, 1924. Preference was in sight.

The first order for bounty wine came on 29th January, 1925, in the form of a cable from my firm to me for 30,000galls. of red sweet wine, followed later in the year by another order for 110,000galls.

This was the beginning of a new era in Australia's export of wine. We had invaded the stronghold in England which had been held since the Duke of Marlborough's day by Portugal for Port wines, and since long before that, by the Sherry merchants of Spain who shipped their wines in Queen Elizabeth's reign.

These first orders were placed in view of Mr. Baldwin's promise of preferential duties for our wines—a promise which he redeemed as soon as possible after his return to power and about April, 1925. The British duties on fortified wines were reduced from 8s. per gallon on all wines over 30 per cent. to 4s. for wines grown within the Empire. This of course did not restrict the market to Australian wines, but it was a great stride forward, and nowadays South Africa and certain other minor British possessions join issue with us in the competition to defeat the foreigner in England. Unfortunately, no steps were taken to impose adequate duties on so-called "British wines" made from foreign concentrated grape juice, which is imported into England duty free, broken down with water and fermented out into an alcoholic beverage which, being very cheap, finds favour with the poorer classes. British wines are our most dangerous competitor.

The trade grew and expanded rapidly. The rate of bounty has been most vexatiously altered no less than six times and will again change next March for the seventh time, but still the trade continues to expand, and if we allow for Burgundy which fell from 820,000galls. pre-war to about 500,000galls. post war and has never regained its old figure, we find that the export of sweet wines of Port type has risen from nil in 1924 to 2½ million gallons in 1934-35 and to almost 3 million gallons in the last fiscal year. These export figures include New Zealand and Canada. New Zealand has been a constant customer for a limited quantity for 40 years or so, and is well canvassed. Canada, with a population of about 7 millions, has only known our wines for about 4 or 5 years when she granted us a measure of Imperial Preference. Trade there is difficult, being restricted to Government channels only. There is a Liquor Board in each province. One can only sell through that board. I am hoping this trade may grow, but South Africa is a keen competitor for that market.

Seeing that in spite of a bounty of 1s. 3d. per gallon we cannot compete in England or Canada without a preferential rate of duty, you will readily understand that it is quite out of the question to compete in Europe, or indeed in America, where California is a much larger producer of wine than Australia, and will certainly not allow access to our wines.

Our Government is just now trying to adjust the balance of trade with the United States of America, and amongst other things, placed an embargo (which is going to be removed) on oak staves for cask-making from America.

Now gentlemen, a hogshead holds 66galls., therefore roughly 15 hogsheads hold 1,000galls. 1,000,000galls. therefore needs 15,000 hogsheads, and 3,400,000 (last year's exports) need about 50,000 casks. Think of the work involved in making these. Some come back it is true, to be filled again, and some—perhaps 15 per cent.—are made of native timbers, but certainly 40,000 casks have to be made up annually.

I want to impress on you the value of this trade to South Australia, which ships no less than 89¼ per cent. of all the wine which leaves Australia. The latest figures show that there are, in round figures, 35,000 acres of vines in this State. You gentlemen know more about wheat growing than I do, but I think I have heard that one man cannot handle more than about 300 acres of wheat by himself; 35,000 acres would therefore occupy about 120 men. I think it is safe to say that this area under vines will keep 10 times that number very busy indeed, and of course a great many more at vintage time.

I find I have overlooked our export of brandy which is made from wine—71galls. in 1931 and nearly 73,000galls. in 1936. The joint cheque coming into South Australia for brandy and wine (after deducting about 500,000 of Burgundy) has risen from nothing in 1924 to approximately £880,000 in 1936. These figures are very remarkable, and would be greater in the case of wine had we been more careful as to what we shipped overseas. A good deal of inferior wine went out, due to lack of knowledge of scientific treatment. There is the greatest need for care, and whereas in earlier days one could rely upon one's palate, certain diseases have appeared amongst our wines necessitating a much deeper study of the chemistry of wine, and have forced upon us a great deal of analysis and microscopic examination of our wines. It is for this reason that an advanced course of Oenology, that is, the science of wine-making, has been instituted at Roseworthy College for students from our own and other Colleges in Australia desiring such a course, and an exchange has been arranged so that Hawkesbury College, New South Wales will take Roseworthy lads for an advanced training in dairying, where there is a special course. This is a step in the right direction, and we are, I hope, well on the way towards a research station at the Waite Institute to examine many of our wine and viticultural problems when we shall be enabled to adopt remedial or preventive measures and avoid a great deal of loss.

Comparisons are odious; nevetheless, if you will take home copies of this paper you will find some figures which are illuminating.

Quite apart from the primary production of grapes, that is, the vineyard side of it, where we have 35,000 acres in South Australia of a value, let us say, at a low average of £30, totalling over a million pounds; we have as many establishments handling wine as there are producing butter, bacon, cheese and flour combined. Breweries, jam and dried fruits are literally out of the hunt in point of numbers.

In capital costs we are far ahead of all the others. Just compare the cost of salaries and wages and the value of gross output, and I think you will be convinced of the importance of the export of our wines.

Area under Wine Grapes and Production in South Australia.

	Wine Grapes, Acres.	Wine. Galls.
1860	negligible	negligible
1870	5,500	900,000
1880	4,000	500,000
1890	7,000	500,000
1896	11,000	1,743,090
1900	17,000	1,000,000
1906	14,000	2,755,947
1916	18,216	3,709,878
1926	30,187	13,074,874
1927	30,419	16,159,595
1933	33,325	12,260,971
1934	32,451	10,032,012
1935	33,159	12,914,905
1936	(not available)	12,350,000

SUMMARISING THE ECONOMIC VALUE OF WINE MAKING AND DISTILLING IN COMPARISON WITH OTHER NATIONAL INDUSTRIES (1934-35 DATA).

	Wineries and Distilleries.	Butter, Cheese, and Bacon.	Grain Milling.	Breweries.	Dried Fruit, Jam and Canned Fruit and Vegetables.
	£	£	£	£	£
I. Capital Costs.					
1. Land and buildings	585,913	235,729	180,996	191,979	82,703
2. Plant and machinery	416,309	138,290	214,231	215,979	56,579
II. Annual Costs of Material, Fuel, Light, &c., Used.					
1. Raw material	1,298,127	977,916	976,331	86,575	108,568
2. Non-returnable containers	35,957	29,899	31,634	51,091	39,427
3. Tools replaced and repairs	16,142	9,595	18,795	12,669	1,790
4. Power, fuel, oil, light, and water	20,539	20,023	26,593	15,536	3,797
Totals	1,370,765	1,037,433	1,053,353	165,871	153,582
III. Costs of Salaries and Wages.					
	150,789	105,812	89,864	77,092	39,812
Combined yearly expenditure, exclusive of interest	1,521,554	1,143,245	1,143,217	242,963	193,394
IV. Employment.					
	No.	No.	No.	No.	No.
1. Establishments	92	50	36	7	9
2. Working proprietors	39	12	25	2	10
3. Manager and overseers	48	52	22	27	8
4. All other employees	614	492	364	208	296
Total	793	606	447	244	323
V. Value of Gross Output.					
	£1,853,104	£1,253,871	£1,219,671	£390,134	£217,006

QUANTITIES EXPORTED.

	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.
	Galls.	Galls.	Galls.	Galls.	Galls.	Galls.
Brandies	361	4,883	15,482	54,456	86,296	Not available
Wines	2,204,920	3,471,574	3,095,453	3,068,738	3,394,597	
South Australian Share—						
Brandies	71	4,166	13,508	42,739	68,606	72,736
Wines	1,837,986	3,035,127	2,680,313	2,577,660	3,009,723	3,427,930

VALUES OF EXPORTS.

	£	£	£	£	£	£
Brandies	364	2,685	12,386	46,987	77,087	Not available
Wines	508,056	904,506	790,079	803,388	810,031	
Total	508,420	907,191	802,465	850,375	887,118	—
South Australian Share—						
Brandies	27	1,949	10,443	36,701	60,339	58,945
Wines	418,240	800,587	708,508	702,392	731,568	870,818
Totals	418,267	802,536	718,951	739,093	791,907	929,763
Percentage value of Commonwealth exports	82·27%	88·45%	89·59%	85·74%	89 27%	—

Note.—Prof. Perkins stated (in 1934) that hitherto about 95 per cent. of exported wines went to the United Kingdom. The figure now is about 93 per cent. New Zealand and Canada now take about 70 to 80 thousand gallons as compared with 50 to 60 thousand.

Is Pea Growing Profitable on the Farm?

Paper read at 1936 Agricultural Bureau Congress.

[W. F. Wurst, Laura.]

This paper is meant mainly for the districts north of Adelaide, where I was born and have spent practically all my life farming.

When travelling through the agricultural areas north of Adelaide, right to the Upper North, one can not help noticing the havoc that has been caused by water erosion, especially in the undulating and hilly country, where year by year hundreds of acres of good land are practically out of cultivation, either because of gutters, or the washing away of the top fertile soil.

This is becoming worse year by year, because farmers keep on robbing the soil of its organic matter by continually growing wheat, oats and barley.

During the past 10 years, many farmers have been tempted to get a quick return from their holdings, which often has proved detrimental to the future fertility of the soil.

Peas definitely improve the soil, as they make it mellow and stronger by adding nitrogen. Further, on those fields that have carried a crop of peas the rain penetrated more easily into the sub-soil.

Varieties.

With peas, the same as all other crops, the right variety for seed is essential. Experience leads me to favour the Early White Brunswick for the severe northern conditions. It is very hardy, quick maturing, and does not grow too much bulk. It sets well and is a fairly heavy yielder, giving a plump seed, with good feeding qualities.

The Early Dun, ripens 2 weeks later, grows a lot of bulk but no more grain. The heavy bulk is only a hindrance when harvesting with present-day machinery.

Cultivation and Seeding.

In a district with a fair rainfall, 16ins. or over, the White Brunswick grows quite well on stubble land. The stubble should be burnt or cleared off; then after the first autumn rain, cultivated; and, if necessary, harrowed, to give weeds a good start; cleared well of all stones, etc., and sown at the end of June with about 60 to 90lbs. of seed and a liberal dressing of manure.

If the peas are sown too early, they are more likely to be caught by frost. If they are sown too late, they are subject to severe hot winds or the ravages of grubs. Frost, hot winds and grubs take the biggest toll on the pea crop.

At seeding, be careful to kill all weeds. After seeding, roll the soil down well; this will save a lot of trouble, time and grain at harvesting. If the soil is well rolled, the peas may be cut with the binder just before they are ripe, especially if 10 or 12lbs. of oats per acre have been sown with the peas. This can be thrashed later, the straw making an excellent stand-by for idle stock in winter.

All stock thrive on peas. Sheep, especially, do well on the stubble with a liberal supply of water. They fatten quicker than on any other feed; giving a good, solid, juicy mutton. The sheep pick up practically every grain, and most of the straw.

A fair pea crop will fatten at least 5 to 10 sheep to the acre. If a fair sized paddock, say 50 acres, it is advisable to fence off 5 or 10 acres first to put the sheep on, and when they have cleared that, add another 5 to 10 acres to this. In this way they are continually getting fresh feed and will top up far better.

Farmers cannot expect the soil to keep in the best producing condition with a continual wheat, fallow, wheat, rotation, and there is nothing better than a change with peas. To keep the soils fertile, it is a good plan to adopt a rotation of wheat (or oats), peas, bare-fallow, wheat, peas, bare-fallow.

This practice will give two crops in three years, and will enrich the soil. It is a far better policy to sow smaller areas and have a good crop, than a big area with a poor return.

Two years ago I drilled in 60 acres of peas, last year 250, and this year 450 acres.

Forty-Seventh Annual Congress Resolutions

At the Forty-seventh Annual Congress of the Agricultural Bureau the following resolutions were carried:—

"That Congress requests the Government to take such steps as are necessary to send an officer of the Department or a representative of the growers to California for two years to study the citrus industry."

"That the Noxious Weeds Act, particularly in relation to Bathurst Burr, be more strictly enforced throughout the whole State."

"That it be a recommendation to the Department to make practical demonstrations of the dehorning of cattle to branches of the Agricultural Bureau."

"That the Bitter Paddy melon be placed on the Noxious Weeds Act."

"That this Congress again requests the Government to turn the Minnipa Farm into a seed wheat farm."

"That this Congress strongly objects to the move to make complusory motor insurance in the country areas, unless there is a substantial reduction in motor registration."

"That in the event of half-yearly road tax on motor vehicles being passed by Parliament, the 10 per cent. surcharge on the tax be abolished."

"That this Congress urges for a reduction in driving licence fees."

"That this Congress presses for a reduction in motor registration fees."

"That the sales tax charged on all goods used by primary producers be reviewed."

"That the sales tax on tyres used on tractors and trucks of primary producers be abolished."

"That the dairy registration fee is an imposition and should be reduced by 50 per cent."

"That this Congress supports Professor Perkins' recommendation for enlarging holdings to 600 sheep carrying capacity."

"That the Farmers Assistance Board and the Department of Agriculture officers co-operate in the developing of the Marginal lands for other purposes as well as for wheat."

"That exporters of seed potatoes to the State of South Australia be compelled to brand the bags containing the potatoes with the name of the grower, the name of the State, locality where grown, and the name of variety of potatoes; brands to be of a sufficiently large size."

"That the Government immediately put work in hand to complete Urrbrae High School, and give it residential facilities."

"That the super bounty of 15s. per ton on super used for barley and top-dressing be continued until 30th June, 1937."

"That a veterinary officer be sent to Eyre's Peninsula to examine stallions for soundness."

"That this Congress protests against the increase of ½d. deducted from Adelaide price per bushel on all wheat delivered to merchants on Eyre's Peninsula this season."

"That the Government be asked to assist farmers in obtaining supplies of suitable seeds true to type to improve pastures."

"That the Transport Board be requested to permit primary producers to send their stock direct to the Abattoirs by hired carriers."

"That in connection with the apple bounty the Federal Government be asked to revert to the old system of payment according to disabilities caused by climatic conditions such as hail, storms, etc."

"That the Government be asked to introduce legislation for the more effective control of straying dogs."

Motions Lost.

"That this Congress views with alarm the action taken by the Commonwealth Government to levy further taxation on the over-burdened wool industry and considers that such moneys should come from general revenue."

"That we ask the Government to continue with the wheat marketing legislation."

"That the clause in the Veterinary Act relative to making 50 per cent. of livelihood from veterinary work be excluded."

Motion Lapsed.

"That as the new system or proposed new system of supplying superphosphate to farmers is certain to prove of great inconvenience, this Congress protests against same."

Tobacco Industry

In the following statement, which was recently given over 5CL broadcasting station, Mr. R. E. Courthope-Giles (Tobacco Instructor) outlines a few important current features of the Tobacco Growing Industry.

The Tobacco growing industry in Australia is slowly but surely increasing in importance, and every effort is being made by various authorities to see that the foundations are well and truly laid.

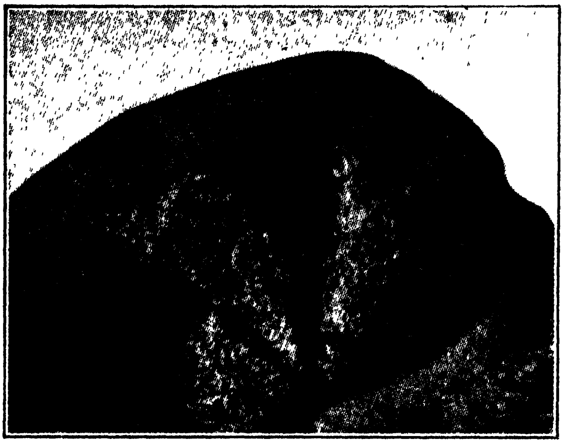
The second Annual Conference of C.S. & I.R. and State Department officials was held in Brisbane at the end of July last, when the various phases of the industry were discussed and excellent progress reports were submitted to delegates.

Considerable advance has been made in the solution of problems affecting the tobacco growing industry. The use of hydrocarbon vapours in the raising of seedlings free from the downy mildew, or Blue Mould disease, as initiated by officers of the C.S. & I.R. has proved to be 100 degrees successful. A thorough trial of this method was made last season in every State of the Commonwealth, by departmental officials and by a number of growers in South Australia with equally satisfactory results. It was thought at first, that the vapours might possibly have some deleterious affect upon seedlings, after transplanting in the fields had taken place; or that possibly the smoking qualities might be adversely affected. The fear proved to be quite unfounded. The thickening of leaf noticed in the seed beds quickly disappeared after transplanting, normal growth taking place. Smoking tests carried out with leaf grown by this method, have also definitely proved that the vapours are in no way harmful.

Prevention of Blue Mould, in the initial stages of the production of tobacco, will be of great assistance to growers. It is now up up to them to make full use of this method; in South Australia, at least, it has been generally adopted, but that in itself is not enough, as growers must for their own benefit, conscientiously carry out the provisions of the Tobacco Growers Protection Act. This legislation was introduced by the Government at the unanimous request of Producers Associations during the 1934 season.

Briefly, this Act provides for the registration of seedling growers with the Department of Agriculture, to ensure the use of the disease-free seed, true to type, and to prevent the sale of infected plants.

To eradicate as far as possible all sources of infection from Blue Mould, growers are required to destroy by fire, or burial, before the 31st day of July in each year, all old tobacco plants, other than



[N S W. Department of Agric.
The Underside of a Young Leaf infected with Blue Mould.

those portions which have been harvested. This of course includes self-sown tobacco plants, the occupier of any land being held responsible for their destruction.

To prevent field infection, it is imperative that growers should carry out the provisions of this Act which is entirely for their own benefit.

Early this month, a Conference was convened in Melbourne by the Federal Commerce Department. Delegates from the C.S. & I.R., State Departments of Agriculture, Commerce and Excise Department, met members of Tobacco growers organisations. It was decided that a Federal Tobacco Advisory Committee of a strictly non-political nature, should be appointed as soon as possible; the Committee to consist of twelve members, two tobacco growers from each State of the Commonwealth.

The suggested functions of this Committee, which must be self-supporting, should be to negotiate with and advise the Commonwealth Government regarding all matters affecting the Tobacco Growing Industry, to promote the orderly marketing of leaf, and to collect statistics relating to the Industry and distribute them among the growers' organisations.

Australia is still importing 70 per cent. of its tobacco requirements, so, while there is room for a considerable amount of expansion, it is highly desirable that this natural movement should proceed in an orderly manner, and upon the right lines. In the past, unsuitable areas have been exploited, with disastrous results to those immediately concerned, and at the same time depressing the whole industry.

The smoking public is the final arbiter of the fate of the industry. It is gradually acquiring a taste for the locally produced commodity, but it cannot suddenly be weaned from a liking acquired over a lengthy period.

The characteristics of leaf vary tremendously. Local climatic and soil conditions will always play their part.

A great improvement is noticeable in the class of tobacco produced here in the last few years; growers are improving in their methods, and turning out a better article, but there is still a long way to go. From every point of view increased production is desirable as we are sending vast sums of money out of the country for foreign leaf. At the same time the public pays, and has to be considered, so we must improve our own quality and so make it possible for manufacturers to satisfy requirements with the local product.

An Irrigated Crop.

A certain amount of leaf will always be imported into this country for blending purposes. Although the United States produces vast quantities of the Virginia type of tobacco, that country also imports a good deal of Turkish leaf for blending purposes, which evidently appeals to the palate of a large section of the American public.

Twenty years ago the United Kingdom could barely absorb a million pounds of Rhodesian leaf annually, to-day twelve times that amount are purchased by manufacturers, and disposed of to the public without any difficulty, for smokers have gradually acquired a taste for a tobacco quite unlike the American which they at one time regarded as being irreplacable.

Neutral leaf is what the manufacturers require at the present time, a tobacco producing a good white ash, which also denotes good burning qualities, and with as little flavour and aroma as possible. Poor sandy country, as found in the South East and Adelaide Hills, and other parts of the State, is most suitable for the production of this type of leaf. Such soils produce a bright type which the public demands. Unfortunately, our rainfall in South Australia is somewhat erratic and at their best our summer rains are light. Growers will be well advised to instal the most suitable form of irrigation for their particular requirements, as soon as possible. The fact of being in a position to irrigate their crops when necessary, will help their prospects of success tremendously. In seasons of good summer rainfall irrigation facilities may not be required, but they should regard the expenditure incurred as a form of insurance, which they cannot afford to dispense with—for it may well mean all the difference between profit and loss on their year's working.

Dungowan and Spotted Gum Varieties.

Payable crops of tobacco are being grown throughout Australia upon sandy soils, in areas with low rainfalls, depending to a great extent upon seepage water from higher surrounding country for the requisite amount of moisture to promote plant growth. The texture of this type of tobacco is non-elastic, of dull though light appearance, contains a high percentage of chlorine giving poor burning quality, flavour and aroma. With increased production, buyers will demand improvement in quality, and rightly so, if they are to replace imported leaf with the local product and still give satisfaction to the public. To obtain this result, land with better drainage will be required and the greater will be the need for facilities for irrigation. Using complete fertilizers, it is far easier to produce tobacco with the desired smoking qualities on really poor sandy soils by means of irrigation than upon the richer lands which invariably produce some undesirable characteristic or other.

A number of old growers who had ceased production in the Paris Creek and Mount Compass areas of the Adelaide Hills owing to the ravages of the Blue Mould disease have recommenced operations and are now growing their seedlings by the hydrocarbon method. A number of new growers are also at work in these areas.

South Eastern growers sent in a number of entries for competition at the recent Royal Show in Adelaide. The leaf generally was of good quality, but with improved conditions, growers will probably turn more attention to the lighter varieties than has been the rule.

Dungowan and Spotted Gum have shown a certain amount of resistance or tolerance to Blue Mould and, in consequence, have been prime favourites with growers, giving heavy yields of fair quality, but conditions are changing and we must produce what the public demands.

The Department of Agriculture in Adelaide will be pleased to give every possible assistance to new growers, or supply anyone interested with any information that they may require upon the subject of tobacco culture.

Feeding Tests at Parafield Poultry Station

[By C. F. Anderson, Government Poultry Expert.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April, 1935, to 30th September, 1936.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal, 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

5. *Mash*, during autumn and winter.—Crushed barley, crushed wheat, chaffed greenfeed and meatmeal. During spring and summer the mash is varied, bran being substituted for the crushed barley.

Grain.—2ozs. wheat per day.

	No. Eggs Laid 1st April, 1935, to 31st August, 1936.	No. Eggs Laid Month of September, 1936.	Total Eggs Laid 1st April, 1935, to 30th September, 1936.
No. 1 Test	9,257	775	10,032
No. 2 Test	9,291	768	10,059
No. 3 Test	10,209	776	10,985
No. 4 Test	8,208	539	8,747
No. 5 Test	8,522	667	9,189

Spray Plant and Materials

This comprehensive paper on Spraying was read by Mr. C. Pollitt (Assistant Orchardist, Blackwood Experimental Orchard) at the Hills Conference at Gumeracha.

The design of spray apparatus and the manufacture of spray materials have made rapid advances during the last decade, giving the orchardist an entirely new outlook on the control of pests and diseases. Powerful and more efficient spray equipment is available. Research work on spray materials and improved methods of manufacture have resulted, not only in a cheaper but a much more efficient product, and at the same time one less liable to cause plant injury.

It is obvious that for satisfactory results, not only must the spray materials be efficient, but they must be applied in a thorough manner, through an efficient spray plant, and used with a knowledge of their different properties. The object of this paper is:—(1) To draw attention to some factors which greatly influence the efficiency of the modern spray plant; (2) to set out simply the composition, characteristics and uses of the important spray materials; and (3) to discuss spray combinations, spreaders, and adhesives, hard water and spray injury.

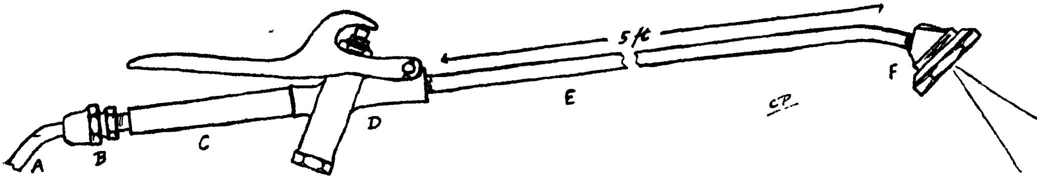
The Spray Plant.

ENGINE.—The engine should always be of ample power to do the work required. An engine working at the limit of its power is not only uneconomical to run, but also deteriorates quickly, frequent repairs being necessary; and gradually, as the engine loses its efficiency, the spray output and pressure will decrease. Lubrication of all moving parts should be thorough; loss of compression, worn bearings, governor parts, etc., considerably decrease the efficiency of the engine. Stops while spraying, due to engine trouble, are costly; they can be minimised by keeping the engine in good repair and well looked after.

Well-sprayed apples, free from disease and Codling.

PUMP.—Spray pumps are of two types;—(1) a piston, fitted with a leather or rubber cup washer, moving in a porcelain-lined or brass cylinder; (2) a long, cylindrical piston moving through a composition graphite packing. In the latter type it is necessary to keep this packing tight to prevent loss of spray. Too tight a packing will increase the load on the engine, and excessive wear of the piston and packings takes place. All packings should be well lubricated. Stuck valves are generally due to the sedimentation of solids or oils breaking out of emulsion; this can largely be prevented by washing out the pump and vat after each day's spraying and before changing sprays. Valves of the mushroom type should be occasionally ground into their seatings; ball valves and seatings should be renewed when it is seen that they are worn or pitted and the pump is losing its efficiency and not holding the pressure. The sieve on the intake is an essential part; it should be kept clean and free. All outfits should have an efficient agitator, which may be disconnected (one type of spray emulsion breaks down under agitation).

There are several types of pressure relief valves. The valve should always be in good



THE SPRAY ROD.
A—Hose. B—Fittings for hose on to ¼in. pipe. C—¼in. pipe fitted with some old ½in. hose as a grip. D—Quick-release valve. E—5ft. of ¼in. pipe. F—Cyclone-type nozzle.

order, the ball and spring being renewed when worn or weakened. A recent introduction—the pressure regulator—has the advantage of easing the load when the spray taps are closed. It is of simple operation on a single cylinder pump, but rather more complicated for larger pumps. A pressure regulator is desirable on stationary systems. Spray hose should always be of the best quality; ¼in. and ⅜in. hoses are to be preferred to the heavy ½in. hose. A quick release tap attached to 5ft. of ¼in. rod, fitted with a cyclone-type nozzle set at an angle, is to be generally preferred to the spray-pistol or gun. The ideal type of spray nozzle is the one giving the greatest volume of a fine spray in a penetrating, fairly wide cone. This is obtained by using in conjunction with a high pressure a good cyclone-type nozzle, fitted with a hardened steel disc of medium thickness, and with an accurately drilled aperture, which is large enough to give a good volume of penetrating spray, yet not too large or worn—the spray zone would then be too wide, flat and wasteful.

Pressure.—The modern tendency is to increase spraying pressures, 200 to 225lbs. per square inch being recommended for use with rods, while about 300lbs. is used with spray guns.

Care of Plant when not in Use.

After spraying, the vat, pump, hoses and rods should be cleaned out by pumping through some clean water. The vat—if wooden—should be kept full; if steel or copper, it should be emptied. If the pump has a leather cup washer on the piston the washer should be oiled to prevent it becoming dry and hard. The hoses should be disconnected from the pump, and, with the rods, drained of any water and hung up in a safe, dry place. It pays to overhaul the plant in winter, replace worn plants, and have all in good working order for the coming season's spraying.

Spray Materials.

Copper Sprays.

Bordeaux Mixture.—This is the most efficient copper spray. It is prepared by the addition of a solution of lime to copper sulphate (bluestone) solution. The chemical reaction which takes place is very complex

Spray hoses and rods have been washed, drained, and hung up after use.

and varies considerably; but, broadly speaking, if the proportions by weight of copper sulphate to lime are equal, the reaction is the formation of a fine suspension of copper hydroxide (the fungicidal principle), together with calcium sulphate and other compounds.

The proportions are important, as they directly affect the solubility of the spray, its persistence on the plant, its fungicidal value, and its safety to plant tissues. A Bordeaux prepared in the proportions of 6 of copper sulphate to 1 of lime has about 5 times the fungicidal value of an equal type. In practice, it is not safe to take advantage of this, as such a spray gives a poor cover, and therefore ineffective disease control; and also has a high content of soluble copper, causing plant injury. By using an approximately equal formula a lasting protective cover is obtained, and the soluble copper content is reduced to a safe point. It is recommended to use a 6 : 4 : 50 or a 5 : 4 : 50 Bordeaux for winter or green-tip spraying, and 3 : 4 : 50 for later sprays on plants which will tolerate summer Bordeaux spray.

Bordeaux mixture is prepared by adding correctly slaked lime solution to the diluted solution of sopper sulphate in the spray tank. The copper sulphate required for the next day's spraying is dissolved over night by putting it in a hessian bag suspended in a wooden barrel of water—generally 1gall. of water per lb. of copper sulphate. The lime should be freshly burnt and of good quality. Water is added a little at a time until the lime is completely slacked; it is then strained and added to the copper sulphate already diluted in the spray tank.

INSTANT BORDEAUX.—This has many advantages over the old method of preparation. When the spray tank is filling and about a quarter full the agitator is set in motion, and neige crystals of copper sulphate are added. Neige crystals are very fine and dissolve quickly as the tank is filling. Hydrated lime mixed in water is added when the tank is nearly full. Bordeaux mixture is the most efficient fungicide spray in use. It is used as a foundation spray in practically all orchards; but can be used with safety only as a dormant or semi-dormant spray. Half strength Bordeaux can be used in summer on some plants without causing injury.

BURGUNDY MIXTURE.—The preparation is similar to Bordeaux, but washing soda is used in place of lime. Burgundy is more liable to cause plant injury, and should not be combined with lead arsenate.

There are various prepared forms of Bordeaux and Bungundy mixtures, but these are not as efficient and are not recommended.

Lime-Sulphur Sprays.

LIME-SULPHUR.—The commercial product is a reddish-coloured liquid, containing calcium mono-sulphide, calcium polysulphides, and calcium thiosulphate. Recent investigation has shown that only the polysulphides have a definite fungicidal and insecticidal value; so the value of a lime-sulphur depends upon its polysulphide content. A good commercial lime-sulphur contains 20 per cent. of polysulphides.

Lime sulphur is a most valuable fungicide and insecticide. As a fungicide, it is used at strengths ranging from 1 in 20 to 1 in 40, as a dormant or semi-dormant spray, and 1 in 80 to 1 in 160 for summer sprays. As an insecticide it is effective at strengths up to approximately 1 in 40. These dilutions are for a 20 per cent. polysulphides concentrate.

Russeting and leaf injury may follow the use of lime sulphur during the growing season, particularly if it is applied at too great a strength or during hot or humid weather. Some plants (*e.g.*, stone fruits) are susceptible to lime-sulphur injury; on these only very weak applications can be used during the growing season.

Drums in which lime-sulphur is stored should always be kept air-tight, as lime-sulphur deteriorates on exposure to air.

HOME-MADE LIME SULPHUR.—This can be prepared by boiling for ¾ hour 20lbs. of sulphur and 10lbs. of quicklime in 10galls. of water. This gives a product with about 9 per cent. of polysulphides, and should be used at twice the strengths recommended for the commercial product.

Other forms of lime-sulphur sprays are: —Self-boiled, dry-mix, and dry lime-sulphur. These are of little value, and are not recommended.

Arsenical Sprays.

Lead Arsenate.—This is the standard arsenical spray material, more correctly termed acid lead arsenate. The chemical analysis is used as a basis of comparison and purity. The arsenic pentoxide content of a good brand should be about 32 per cent. The water soluble arsenic content is of importance, as leaf injury and russeting sometimes reported are caused by the water soluble arsenic; also by humid weather conditions. The water soluble arsenic should be below 0.25 per cent. The particle size or fineness is important, as it affects the toxicity. Lead arsenate was first sold as a paste, but to-day the powder is used in preference, as it possesses many advantages.

Apples carrying excessive lead arsenate. Spray was too strong—8lbs. per 100galls.

Lead arsenic is a stomach poison, and is used to combat chewing insects. To be effective, a lethal dose must be digested by the insect; hence the importance of the particle size and the completeness of the spray cover. The concentrations employed vary from 1½lbs. to 6lbs. of powder per 100galls., depending upon the pest and its severity. Stone fruits are susceptible to arsenical spray injury if the water soluble arsenic content is too high, or if sprayed under hot, humid conditions.

Colloidal Lead Arsenate.—This is a thin fluid paste, containing 50 per cent. of lead arsenate which is in an extremely fine state. It also contains an appreciable amount of a colloid, which keeps the particles in suspension.

Basic Lead Arsenate.—It is stated that this can be used with safety on plants subject to arsenical spray injury, and can more safely be mixed with lime sulphur. In practice, it requires twice the quantity of basic lead arsenate to give results comparable with ordinary lead arsenate.

Calcium Arsenate.—This is very liable to cause plant injury, and has been found less efficient than lead arsenate.

Oil Sprays.

These are prepared by the addition of an emulsifier to various petroleum oils. They are essentially divided into two classes:—(1) winter; (2) summer oils.

Winter Oils.—These are unrefined or partly refined oils. They are termed red oils, and vary considerably in character.

Cleopatra apples showing typical injury due to summer oil spray.

Winter oils are a contact spray, and are very effective insecticides and ovicides. They are also sometimes used to advance the flowering of certain varieties of apples. The strengths used are 1 in 20 or 1 in 25. This is essentially a dormant spray.

SUMMER OILS.—These are more highly refined. The refining is necessary to remove the unsaturated and aromatic hydrocarbons, which cause burning of the foliage and fruit. Refining does not appreciably affect the toxicity of the spray. Viscosity, volatility, and quick breaking of emulsions are also of importance, as they influence the toxicity of the spray and its effect on the tree. Summer oils are employed as an insecticide, and to some extent as an ovicide. The strengths used are:—For citrus, 1 in 40; and for deciduous fruits, 1 in 60.

Pale oils are a class intermediate between winter and summer oils.

Tar Distillates.

These are essentially winter sprays, and are effective ovicides and insecticides; but, due to the success of petroleum oil sprays, tar distillates are not widely used. They are unpleasant to apply, burning the skin of the sprayers' faces if not protected by a coat of grease.

Tar distillates have been proved superior to petroleum oils for the destruction of aphid eggs, and are used to destroy the winter eggs of the Green Peach Aphis and Black Cherry Aphis. The strength recommended is 1 in 40.

Plant Extracts.

NICOTINE SULPHATE.—The commercial product has a nicotine content of about 40 per cent. Nicotine sulphate is a very effective insecticide; it has been found that its efficiency is largely dependent upon it quickly becoming volatile. This is achieved by the addition of a liberator (cr activator), and by high temperatures. The liberator commonly employed is soft soap, 4lbs. per 100galls. Other effective liberators are petroleum oils, hydrated lime, Bordeaux mixture and lime-sulphur..

An outstanding quality of nicotine sulphate is that, even at excessive strengths, it will not injure fruit or foliage, and it is therefore of great use during the growing season. It can also be used in combination with all other sprays. Spraying with nicotine is more effective if done on a hot day. The strength recommended is 1 pint per 100galls., plus a suitable liberator.

PYRETHRUM AND ROTANONE.—These are valuable insecticides which do not affect the plant. These extracts, however, are expensive, and stable materials of a definite composition are not available commercially.

Spray Combinations.

Sprays may be combined to decrease costs and labour, and to increase the efficiency of some sprays. The safe and effective combination of sprays calls for careful consideration, a knowledge of the materials, and practical experience.

The following combinations may be used with advantage:—

BORDEAUX MIXTURE AND LEAD ARSENATE.—This combination is occasionally required. There is no inter-action between the materials if the Bordeaux is prepared first and the lead arsenate added. This spray has poor covering and adhesive properties. These are remedied by the addition of ¼gall. of spraying oil per 100galls.

LEAD ARSENATE AND LIME SULPHUR.—This is frequently employed for the control of Codling Moth and Black Spot. There is a certain amount of inter-action between the materials; a black precipitate—lead sulphate—is formed and water soluble arsenic, which is liable to burn foliage and fruit, is liberated. The addition of hydrated lime retards the action, and neutralises any soluble arsenic set free.

The lime sulphur spray should be first prepared. The lead arsenate and an equal amount of hydrated lime mixed together in a few gallons of water are then added to the spray, which should be applied immediately.

LEAD ARSENATE AND OIL.—Of recent years this combination has been used with advantage. The oil acts as a spreader and an adhesive. The amount of oil used varies from ¼gall. to ½gall. per 100galls. for red oil, and ¾gall. to 1gall. for summer oils. It is doubtful if the oil is an ovicide at these strengths.

BORDEAUX MIXTURE AND OIL.—Small amounts of spraying oil may similarly be used with Bordeaux Mixture to obtain a better cover.

LEAD ARSENATE AND NICOTINE SULPHATE.—This combination is used where control of both chewing and sucking insects is required. A liberator is necessary for the nicotine sulphate; 5lbs. of hydrated lime per 100galls. is recommended. Soft soap must not be used with lead arsenate.

Spreaders and Adhesives.

The effect of a spreader is to increase the spreading and penetrating properties of a spray. While this is an advantage where it is necessary to penetrate a woolly surface, it is a disadvantage under many conditions, as the amount of spray which runs off is so great that an efficient cover is not obtained.

When sprays are applied with an efficient modern outfit the spreading property of the spray liquid is of little advantage. The adhesion of a definite amount of spray to the plant is of far more importance, as it is a determining factor in the spray's efficiency. The adhesion of sprays can be greatly improved by the addition of an adhesive or sticker.

Numerous substances have been tried as spreaders and adhesives. Recent investigation shows that the most efficient is a small amount of spraying oil; ¼gall. to ½gall. of spraying oil per 100galls. is recommended.

Soaps sometimes used are not safe to use with lead arsenate or Bordeaux Mixture, as chemical inter-action takes place.

Hard Water.

Hardness is due to various magnesium and calcium salts in solution. Washing soda or soft soap may be used to precipitate these salts, but if used in excess their presence makes the water unsafe for use with Bordeaux mixture, lime sulphur, and lead arsenate. Hydrated lime may be used for treating hard water required for these sprays.

Provided primary emulsions are properly mixed, there should be little or no trouble with hard water. Dam water containing much clay in suspension is often liable to cause trouble, as it tends to flocculate the particles of some sprays.

Spray Injury.

Many growers do not spray their trees thoroughly for fear of leaf burn, russeting and other injuries. Sprays are capable of doing very serious damage indeed if used at too great a strength, applied in the wrong way, in the wrong season, or under certain weather conditions. This is where a thorough knowledge of the particular sprays, coupled with actual experience, is of great assistance to the orchardist, for he then knows under what conditions spray injury may result, and how he can apply his sprays safely to control effectively the many pests and diseases with which he is confronted.

The Disadvantage of Dirty Seed Wheat.

[A. Hutton, Cambrai.]

It is very disheartening to a farmer, after having very clean land, well cultivated, to see a good crop of wheat spoilt by foreign plants. This is very often the case with farmers who do not take particular care when cleaning their wheat for seed purposes. One of the most common is the mass production of Cape Barley in wheats. When one looks at the seed wheat and can see an odd grain of barley here and there, one may think there is not enough to cause any trouble, but roughly averaging this up, when one grain of barley is sown this solitary grain produced about 600 grains when harvested, and one grain of wheat alongside of it will produce about 90 grains. By sowing this seed the following year that one grain of barley sown the year before will produce about 360,000 grains in the second year. The third year the total is 216,000,000.

These figures sound very high, but it shows how Cape Barley, which is a heavy yielder, would soon have drastic effects on the sample of wheat harvested from seed wheat that is not kept clean.

There are two methods of keeping wheat free of barley. One is by grading the seed, which takes out about 90 per cent. of barley. The second is by hand-picking the heads of barley from a small piece and reaping this piece separately. The latter is the slowest, but the surest. The millers would soon dock wheat when barley is too prevalent; therefore farmers must pay attention to the preparation of their seed.

Egg-Laying Competitions

Official Single Test conducted at Parafield

Review of the Competition for the month of September, 1936, by M. W. Aird (Poultry Adviser) and A. Clifton (Competition Attendant.)

During the early part of September the birds reached their highest point of production for the year, and the production held good throughout the whole of the month.

However, the weight of eggs has decreased considerably; this fault was very conspicuous amongst the birds that are producing very heavily. In some instances, birds which were laying 2⅛oz. eggs during the early part of the month reduced the size of their eggs to 1⅞ozs. towards the end of the month.

During the currency of the test top position in the White Leghorn Section has been held by four different birds, and each of the birds concerned lost the position through laying some under-weight eggs.

The decrease in the weight of eggs has come about approximately one month earlier this year; on other occasions it has generally held good until about the end of October. The early drop in weight this year is probably due to some extent to the abnormal dry spring.

In the Black Orpington Section, bird No. 412, entered by Mr. J. Rawe, lost first position through laying some under-weight eggs.

In the Rhode Island Red Class a pullet entered by Mr. A. G. Dawes laid 24 first-grade and two second-grade eggs, which equals 26 eggs in the 30 days, and another pullet (same owner) laid 25 first-grade eggs in the 30 days.

David Hart's pullet in the Home Project Section is still keeping up her reputation, and laid 27 first-grade eggs for the month. Included in this bird's performance was a sequence of 17 first-grade eggs laid in 17 days. The total weight of the 27 eggs laid by this pullet was 57¼ozs.

There were two deaths during the month, bringing the total deaths to date to 11.

The daily average production of all eggs laid for the month was 334, and daily average first-grade eggs 265.

LEADING SCORES TO 30th SEPTEMBER, 1936.—FIRST GRADE EGGS ONLY.

SECTION I.—WET MASH.

Class 1.—White Leghorns—351 birds competing.

Singles—	Eggs Laid.	Birds Nos.
Willow Bend Stud Poultry Farm	136	186
E. Portlock	135	56
V. E. Williams	135	109
W. Sickert	134	177
S. Lambert	134	194
Trios—		
W. H. L. Norman	369	307–309
A. O. Dawkins	367	85–87
Willow Bend Stud Poultry Farm	364	184–186
Teams—		
A. O. Dawkins	677	85–90
Willow Bend Stud Poultry Farm	656	181–186
Willow Bend Stud Poultry Farm	654	295–300

Class 2.—Any other Light Breed (Minorcas)—15 birds competing.

Singles—		
R. M. Yelland	98	371
V. F. Gameau	97	366
R. M. Yelland	93	372
Trios—		
Langmaid and Bettison	226	358–360
R. M. Yelland	197	370–372
V. F. Gameau	180	364–366
Teams—		
Langmaid and Bettison	345	358–363
V. F. Gameau	296	364–369

Class 3.—Black Orpingtons—45 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	125	381
A. G. Dawes	124	377
Willow Bend Stud Poultry Farm	122	384
Trios—		
Willow Bend Stud Poultry Farm	353	379–381
Willow Bend Stud Poultry Farm	350	382–384
H. H. Gallagher	305	397–399
Teams—		
Willow Bend Stud Poultry Farm	683	379–384
H. J. Mills	554	385–390
A. G. Dawes	537	373–373

Class 4.—Any other Heavy Breed—36 birds competing.

Singles—		
A. G. Dawes (Rhode Island Reds)	126	38

Class 4.—Any other Heavy Breed—36 birds—*continued.*

	Eggs Laid.	Birds Nos.
Willow Bend Stud Poultry Farm (Rhode Island Reds)	124	424
A. G. Dawes (Rhode Island Reds)	124	419
Trios—		
V. F. Gameau (Rhode Island Reds)	285	433–435
K. Pennack (Barnevelders)	275	439–441
A. G. Dawes (Rhode Island Reds)	270	37–39
Teams—		
K. Pennack (Barnevelders)	527	436–441
Willow Bend Stud Poultry Farm (Rhode Island Reds)	469	424–429
V. F. Gameau (Rhode Island Reds)	459	430–435

SECTION II.—DRY MASH.

Class 5.—White Leghorns—15 birds competing.

Singles—		
A. E. Dawkins	140	449
A. O. Dawkins	123	452
A. O. Dawkins	123	453
Trios—		
A. O. Dawkins	353	448–450
A. O. Dawkins	348	451–453
Willow Bend Stud Poultry Farm	300	454–456
Teams—		
A. O. Dawkins	701	448–453
Willow Bend Stud Poultry Farm	510	454–459

Class 7.—Black Orpingtons—6 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
Willow Bend Stud Poultry Farm	125	468
Willow Bend Stud Poultry Farm	111	466
Trios—		
Willow Bend Stud Poultry Farm	308	466–468
Willow Bend Stud Poultry Farm	200	463–465
Teams—		
Willow Bend Stud Poultry Farm	508	463–468
Willow Bend Stud Poultry Farm	453	463–468

Class 8.—Rhode Island Reds—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	112	471
Willow Bend Stud Poultry Farm	111	470
Trios—		
Willow Bend Stud Poultry Farm	293	469–471
Willow Bend Stud Poultry Farm	241	472–474
Teams—		
Willow Bend Stud Poultry Farm	534	469–474

SECTION III.—WET MASH.

Class 9.—Any Breed—27 birds competing.
(Home Project Utility Section.)

Name. School. Breed.		
David Hart, Unley High, Black Orpington	151	495
William Horne, Woodville High, White Leghorn	127	490
Anthony Rix, Williamstown, White Leghorn	123	478
Keith Oliver, McLaren Vale, Black Orpington	121	498

Noxious Weeds.

[B. McCallum, Morchard.]

One must have a thorough knowledge of the various noxious weeds, particularly in the district in which they live, and be able to detect them when they are just starting to grow, for that is the most successful time to destroy them. The star thistle is the greatest enemy on our farms at present; it has been neglected for so long on public roads, especially on the travelling stock routes. The star thistle is difficult to observe when the plant is small, and does not stem up until late in the season. It requires attention at a most inconvenient time for farmers—about hay harvest, when every available farm hand is occupied with harvest work, especially in good seasons, and that is when the weed is most prolific. But the job must be tackled if the star thistle is to be controlled. It is a good plan to carry a hoe when attending to stock, shifting the sheep, or getting in cows. The stray plants may be cut without much loss of time. When carting hay, if you have a saddle horse, while the vehicle is going from stack to paddock, one person can put in a little time cutting in gutters or along fences. I have purchased sections with the star thistle having a good start to overrun the place, but by this means have prevented them spreading, and eradicated them altogether on a good portion of the land. Where the thistle is thick and well advanced a slasher or scythe may be used. It is not recommended for general practice, but as a last resource when no other means will cover the area in time.

Other weeds that need our attention are:—Hoarhound, wild onion, thistles (horse thistle, Scotch, and variegated), boxthorn, canary creeper, and Bathburst burr. Most of these weeds must be dealt with in a similar way to the star thistle. Always remember that one year's seeding of these weeds requires seven years' weeding.

Turretfield Seed Wheat Farm Harvest Report 1935-36

[By R. C. Scott (Chief Agricultural Instructor) and F. E. Waddy (Farm Manager).]

The production of selected and improved strains of seed wheat for disposal to farmers throughout the State is the chief function of the Turretfield Farm. That there is need for such work is evidenced by the fact that all the grain offered since operations were commenced has met with ready sale, and last year upwards of 1,500 bags were disposed of. This must have influence on the average grain yield of the State, since stud cereal work involves not only selection for purity but also selection of the most prolific strains, either because of inherent yielding ability, disease resistance, drought resistance, or some other factor. It is now four years since the work of Turretfield has been devoted to the selection of seed wheat. Prior to that, the Turretfield farm was used for the purpose of ascertaining the cost of farming operations and records of all expenses were carefully kept.

The North Para River runs through Turretfield Farm. The homestead is in the background.

At the time of the change, supplies of selected seed were not obtainable in the State, and it was necessary to commence operations from the initial stages, that is to say, from a limited number of individual ears each of which was selected from a plant possessing the desired characteristics. Consequently, we are only now reaching the stage when the commercial seed plots are being planted with grain built up from the hand-selected ears. The farm is conveniently situated, being about 35 miles to the north of Adelaide and 10 miles in a north-easterly direction from Gawler. As a result, intending purchasers of seed wheat often take the opportunity of inspecting the crops in the field whilst the Field Day which is held during November of each year is regularly attended by a large number of people.

The total area of Turretfield is 1,604 acres, but all of this is not available for cropping. Portion consists of rough hilly land which does not permit of tillage, but at the same time yields excellent natural grazing. The North Para River and the Salt Creek also run through the property, and when the area thus taken up together with that occupied by buildings, plantations, &c., is calculated, it is found that approximately 1,250 acres are available for seed wheat purposes. This is cropped on a three-year rotation, the cereal crop, of course, being planted on well prepared fallow and followed by pease, oats for grazing or natural pasture.

Generally speaking, the soil is of a red loam nature with some calcareous patches, and silty flats adjoining portion of the river. At the same time, there are appreciable areas where red clay particles predominate, and as these tend to run together and set hard after heavy rain, they sometimes offer serious difficulty to young germinating cereal crops.

The 1935 Season.

Particulars of the rainfall recorded at Turretfield for the last four years comparatively with the average for the 1908-35 period are shown in the following table:—

RAINFALL AT TURRETFIELD.

	1932.	1933.	1934.	1935.	Means, 1908-35.
	In.	In.	In.	In.	In.
January	0·45	1·44	0·36	0·76	0·56
February	0·99	0·13	—	—	0·67
March	0·92	0·57	0·36	1·87	0·79
April	2·60	0·92	1·94	1·45	0·88
May	1·14	3·04	0·12	1·44	2·29
June	4·00	0·59	0·97	2·64	2·16
July	2·27	1·55	1·94	1·74	2·05
August	2·44	2·67	2·37	2·48	2·14
September	1·71	3·29	2·93	2·87	2·36
October	2·29	0·72	2·04	2·35	1·71
November	0·34	0·36	2·16	0·80	1·00
December	0·89	1·05	0·30	0·42	0·92
Total	20·04	16·33	15·49	18·82	17·53

"Useful" Rainfall.

	1932.	1933.	1934.	1935.	Means, 1908-35.
	In.	In.	In.	In.	In.
Seeding Rains (April-May)	3·74	3·96	2·06	2·89	3·17
Winter Rains (June-July)	6·27	2·14	2·91	4·38	4·21
Spring Rains (August-October)	6·44	6·68	7·34	7·70	6·21
Early Summer Rains (November)	0·34	0·36	2·16	0·80	1·00
Total	16·79	13·14	14·47	15·77	14·59

The total rainfall for 1935, namely, 18.82in., is above the average fall for the last 28 years. The additional amount is also reflected in the "useful" rainfall, that is to say, that which falls during the growing period of the crop, and practically 1¼in. more rain was recorded from April to November in 1935 than is usual between these two months.

Reviewing the rainfall conditions during the year, it may be said that they were fairly satisfactory, but a heavy thunder storm experienced on 1st June badly washed the recently sown wheat-land, making deep gutters and sweeping away the surface soil in some fields. Again, in the spring further heavy showers knocked down and tangled some the best crops, necessitating these patches being cut for hay.

A considerable amount of damage was also caused by heavy winds which blew during the ripening period. This was particularly the case with the varieties in Field No. 12, which were knocked about to the extent of several bushels of grain to the acre.

The grain filled well and after cleaning graded out to a plump attractive sample of seed wheat.

Wheat Harvest.

The wheat crops were planted on well-prepared fallow land from mid-May to mid-June. The rate of seeding was 75lbs. to the acre, and all crops were dressed with 156lbs. of 45 grade superphosphate to the acre.

WHEAT YIELDS TURRETFIELD, 1935-36.

Field No.	Variety.	Acreage.	Total Yield.		Acre Yield.	
			Bush.	Lbs.	Bush.	Lbs.
13	Ranee 4H	53·07	1,656	40	31	13
3	Dundee	8·62	250	23	29	3
3	Ghurka	16·77	451	44	26	56
9	Sword	31·48	803	44	25	32
3	Ranee 4H	1·03	25	0	24	16
3	Sword	4·81	116	0	24	7
3	Sword	4·83	114	0	23	36
3A	Ford	21·72	508	19	23	24
3	Nabawa	3·81	86	48	22	47
3	Ford	1·36	30	40	22	33
3	Nabawa	1·87	41	30	22	12
1	Ghurka	23·53	521	20	22	9
3	Sword	1·58	35	0	22	9
3	Federation	0·78	17	0	21	48
3	Waratah	7·06	153	0	21	40
3	Waratah	1·13	24	0	21	14
12	Sword	25·26	506	46	20	4
12	Waratah	18·31	350	0	19	7
12	Nabawa	44·84	835	20	18	38
3	Sultan	1·33	24	14	18	33
12	Federation	26·27	449	12	17	6
3	Sultan	24·43	413	15	16	55
		323·89	7,413	55	22	53

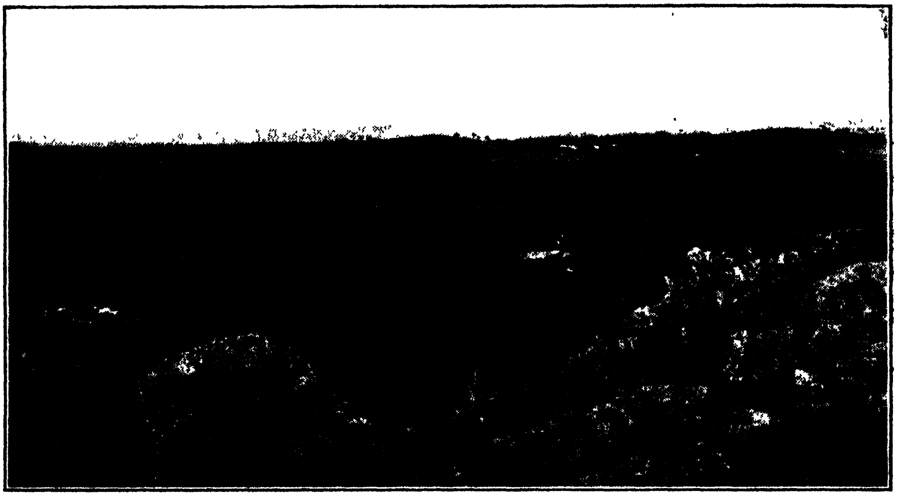
AVERAGE WHEAT YIELDS, TURRETFIELD, 1933-35.

Year.	Area.	Total Yield.		Acre Yield.	
	Acres.	Bush.	Lbs.	Bush.	Lbs.
1933	348·04	7,169	37	20	36
1934	306·19	6,906	36	22	33
1935	323·89	7,413	55	22	53
Mean Yield, 1933-35	—	—		21	58

From the foregoing table it will be seen that from a total area of 323.89 acres, 7,413bush. 55lbs. of grain were secured, making an average yield of 22bush. 53lbs. per acre.

This is the best farm average since Turretfield has been conducted on a seed wheat basis, and it can be safely claimed that a much higher average would have been secured if it had not been for the rough weather experienced in early summer, which caused an estimated loss of up to 3 bags of wheat to the acre in some varieties.

The highest individual yield was obtained from 53 acres of Ranee 4H planted in Field No. 13. This block gave the very satisfactory return of 31bush. 13lbs. to the acre. Dundee was tested for the first time last year and 8.62 acres planted with seed, obtained from the Wagga Experimental Farm in New South Wales, averaged slightly over 29bush. per acre. Other good acre yields were 26bush. 56lbs. from Ghurka and 25bush. 32lbs. from Sword. It is not possible to compare the yields from individual varieties shown in the previous table as they were planted in different fields and under varying soil conditions. Moreover, some suffered more from storm damage than others and consequently the returns from the varieties in the selection plots, all of which were planted in Field No. 3 and under more or less uniform conditions, are shown in the following table:—



Portion of the Farm is rough, hilly land.

YIELDS OF WHEAT VARIETIES FROM SELECTION PLOTS IN FIELD NO. 3, TURRETFIELD, 1935-36.

Variety.	Acreage.	Total Yield.		Acre Yield.	
		Bush.	Lbs.	Bush.	Lbs.
Ranee 4H	1·03	25	0	24	16
Ford	1·36	30	40	22	33
Nabawa	1·87	41	30	22	12
Sword	1·58	35	0	22	9
Federation	0·78	17	0	21	48
Waratah	1·13	24	0	21	14
Sultan	1·33	24	14	18	33

Not only in the farm averages but also in this variety test does Ranee 4H head the list. This wheat has proved a splendid grain wheat and has yielded extremely well at Turretfield during the past three seasons.

Ford is also a first class variety producing good returns of both quality grain and hay, and at the same time exhibiting strong disease-resisting powers.

Nabawa has invariably given better yields than its appearance leads one to expect, and headed the averages in 1934.

Sword can be regarded as the best all-round wheat at Turretfield, as it makes good heavy hay and is also a good grain yielder.

Hay Harvest, Turretfield, 1934-35.

The great bulk of the hay comprised headlands and divisions cut between the varieties, together with a few patches which had been so lodged by wind that difficulty in harvesting with the strippers would have been experienced if left for grain.

HAY YIELDS, TURRETFIELD, 1935-36.

Field No.	Variety	Acreage.	Total Yield.			Acre Yield.		
			T.	C.	L.	T.	C.	L.
9	Sword	11·55	29	10	0	2	11	9
3A	Ford	16·08	40	10	0	2	10	42
3	Various wheats	14·25	34	10	0	2	8	47
12	Various wheats	31·34	59	10	0	1	17	109
13	Ranee 4H	5·07	9	0	0	1	15	56
1	Ghurka	2·95	4	0	0	1	7	13
	Totals	81·24	177	0	0	2	3	64

In all, 177 tons of wheaten hay were cut from 81.24 acres, making an average hay yield of 2 tons 3cwts. 64lbs. per acre.

Returns of over 2½ tons per acre were gathered from the plots of Sword and Ford, both of which are very good hay wheats.

In addition to the above figures, 40 tons of oaten hay were cut from 40 acres of stubble land planted with oats for grazing purposes. For a number of years it has been the practice to sow oats for sheep grazing in the wheat stubble. In the red heavy land of Turretfield, very little natural grazing is obtained in the first season after a wheat crop planted on clean fallow land, and oats have been found very valuable for sowing as pasture under these conditions. They recover well after feeding off and continue to make growth well into the summer. Further, there is no grass seed trouble and the land is left clean for future wheat crops.

Field No. 4 was sown with oats for this purpose. The crop was fed off until the beginning of September, when 40 acres were shut up and eventually yielded 40 tons of fine quality hay. The balance of the field was regularly grazed throughout the year, and provided good fodder until the end of January. In this connection, oaten pasture works in well with pease planted for grazing purposes as the pease come in after the oats are finished.

Fodder Crops.

Last year, Field No. 26 which was becoming over-run with geranium was worked up and seeded in July with pease, Wimmera Rye Grass and Dwalanup Subterranean Clover. A good stand resulted and provided an abundance of feed during the summer months. The clover did not make much headway, being cleaned out by the lucerne flea, but the MacDougall strain of Wimmera Rye Grass made strong growth and has re-seeded itself well this year. At Turretfield the planting of rye grass with the pea crop has proved an excellent way of establishing this very valuable pasture.

Tests of Quality Adapted to Hand-Ground Meals

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Synopsis: Part (a).—The importance of maltose production or diastatic activity in flour is explained, and the necessity of distinguishing it from gluten qualities or "strength" is stressed.

Part (b).—A test for diastatic activity in wholemeal is described and, on the basis of experimental results, it is concluded (1) that heredity is as important as environment in determining the diastatic activity of wheat, and (2) that the diastatic activity of flour, though considerably modified by differences in milling technique, can be reliably predicted from that of wholemeal.

Maltose Production.

(*a*) IMPORTANCE.

Of all crop plants, wheat yields the most suitable flour for making leavened bread, and this characteristic is directly attributable to the content of gluten which is peculiar to wheat. Leavening is the result of the formation of carbon dioxide gas, or CO_2, in the dough by yeast, and gluten enables the dough to hold the gas in minute bubbles dispersed throughout the mass. If flour did not contain gluten, but was otherwise the same, it would absorb much less water and form a pasty mass in which the gas bubbles would form, expand, join together, rise to the surface and escape, producing only a paste or batter instead of a dough.

Gluten, therefore, confers on the flour the capacity to hold the gas and bake into large, well-aerated loaves, *provided that* sufficient gas is formed in the dough to expand or inflate it properly. *If gas production is inadequate, the possibilities latent in the flour by virtue of its gluten content cannot be realised.* Most Australian wheats tend to produce such flours. They will often be regarded as "weak" by the baker, although the same flour might be really a "strong" one, and would be so recognised if its gassing power was increased. Consequently, the gassing power of a flour *must* be regarded as a separate and distinct factor in "quality," and it *must* be isolated from the other factors for independent study and control. Lack of understanding of the independence of these two factors has led to much confusion in the past.

Before any useful results can be expected from attempts to control it, the nature of yeast fermentation, *i.e.*, the process by which gas is produced in the dough, should be clearly understood. The yeasts used in modern bakery practice are specially selected strains of "distillery yeasts," which bring about in the dough a type of alcoholic fermentation similar to that which takes place in the manufacture of beer and other alcoholic beverages. The raw materials fermented by yeasts are simple sugars, and the products are about equal quantities by weight of ordinary alcohol and a gas—carbon dioxide, or CO_2—together with very small quantities of certain by-products such as acids and other alcohols.

In fermented beverages the alcohol is the important product, and the CO_2 largely escapes. In a fermenting dough, on the other hand, the alcohol is of little importance, and is mainly driven off during baking, but the carbon dioxide gas inflates or leavens the dough, making it open and porous. Under the influence of the oven's heat the gas bubbles expand, while water and the alcohol also tend to evaporate into them thereby helping to enlarge them so that the dough is aerated and the loaf greatly expanded after it enters the oven and before it begins to set or bake. Thus the size of the loaf and its texture mainly depend upon the quantity and distribution of the gas held by the dough *when it goes into the oven.*

The production of gas is not the only change which takes place in the dough during fermentation. In addition, the dough slowly "ripens," that is, the gluten mellows down and acquires better physical characteristics, amongst which is an improved elasticity and capacity for holding the gas. This is partly due to increasing acidity arising from the accumulation of by-product acids and CO_2, but mainly to a secondary effect of the yeast on the gluten as indicated below. It is, of course, only the gas retained by the dough that effects aeration of the loaf, and so this development of the gluten is absolutely necessary if a good loaf is to be made. The most satisfactory result is obtained if the loaf goes to the oven when this development has reached its maximum, that is, when the dough is "ripe"; after this point deterioration and weakening of the gluten set in, resulting in a break-down of the dough structure, loss of gas, and a generally inferior loaf.

To allow the dough time to become ripe, it is not placed in the oven as soon as gas production has inflated it to a suitable size, but it is "knocked back" once or twice during the fermentation. This consists in squeezing the gas out of the dough, and bringing fresh supplies of sugar to the yeast, which then begins a new and more vigorous fermentation. Dough, being semi-solid, does not allow movement of the yeast cells which must cease to ferment when they have exhausted the sugar in their vicinity, and sugar is thus brought to them.

Finally, the dough is thoroughly knocked back and moulded into loaves which then continue to ferment vigorously until they are ready to go to the oven. This is the "proving period," and lasts approximately from 30 to 60 minutes; during this time the gluten development should reach its peak, and gas production must be sufficient to aerate and thoroughly inflate the loaf. Of all the gas formed during the fermentation, therefore, it is only that formed during the last or proving stage that contributes to the size of the finished loaf. The amount of fermentable sugar available to the yeast during this proving period is, therefore, of the very greatest importance since upon it largely depends not only the size of the loaf, but also its texture, and crumb colour. Further, the flavour of the bread depends to a large extent on the presence of a small amount of residual or unfermented sugar, while the colour of the crust is due primarily to the caramelisation by heat of residual sugars. Thus, all the features that make a loaf attractive and appetising depend upon *an adequate supply of sugar being present during the final or proving stage* of the fermentation of the dough. No matter how excellent all other factors are, if the sugar supply is deficient in any degree, the loaf will be inferior.

The quantity of sugar available to the yeast at the critical proving stage, and consequently the gas production, can be controlled to an important extent by means of certain additions to the dough, but to understand this it is necessary to examine the fermentation process more thoroughly. The changes brought about in doughs by yeast are due to the action of chemical substances produced or secreted by the yeast cell known as *enzymes*. Yeast forms three of these *enzymes* which influence gas production, each in a definite way by effecting one particular chemical change. They are:—

1. *Invertase*, which converts cane sugar to simple sugars.
2. *Maltase*, which converts the complex sugar maltose to a simple sugar.
3. *Zymase*, which converts simple sugars to alcohol and carbon dioxide.

In addition, yeast produces other enzymes—the so-called proteolytic enzymes—which slowly liquefy proteins and to which the gradual ripening of the dough is mainly due, but *yeast has no enzymes for attacking the starch grains of flour;* so far as gas production is concerned, its action is limited to sugars.

Flour contains from 1 to 2 per cent. of sugars and so, when a dough containing yeast is made, active fermentation begins. But these pre-existing sugars are soon used up; they are not sufficient in quantity to maintain fermentation for any length of time. If fermentation is to continue, new sugars must become available from some other constituent of the dough. In fact, the pre-existing sugars are all used up long before the dough is ripe and the critical proving period is reached, so that satisfactory proving and baking depend entirely on a sufficiency of new sugars being formed in the dough.

The necessary new sugars are formed from starch which constitutes about 90 per cent. of the flour, and this is brought about by another enzyme—*diastase*—present in the *grain and flour*. Nature has placed it there to make the starch of the grain available to the young plant as it germinates, and the amount of diastase in the grain increases largely when germination begins. In flour, however, the quantity is limited to that originally present. In making the dough, as soon as the flour is moistened the diastase becomes active, attacking the starch by liquefying it and then converting it into a complex sugar called *maltose*. Yeast contains the necessary enzymes to ferment this, as shown above, and it is the only sugar available during the later stages of fermentation. *Consequently, an adequate production of sugar and gas at the critical proving stage depends upon a sufficiently high level of diastatic activity, or production of maltose through the agency of the diastase in the flour.*

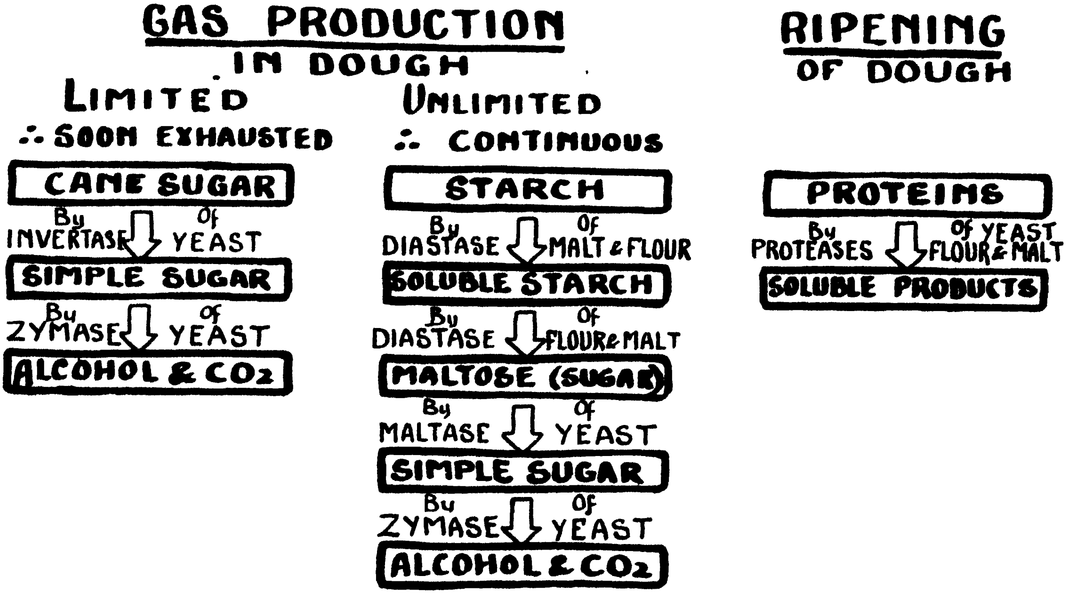

Fig. 1.—Diagrammatic representation of the important changes effected by enzymes in fermenting doughs.

The diastatic activity, and resulting maltose production, vary widely in different samples of flour and grain (see below). It is dependent to a large extent on climatic conditions, tending to be low in samples matured under severe conditions, and high in samples from districts with a longer and milder ripening period. In fact, most authorities have contended that it is solely an environmental characteristic. If this were true, it would not be possible to select or breed varieties of higher diastatic activity, but experience with Australian varieties, which are perhaps particularly suitable for the study, indicates that it is, to a considerable extent, a varietal characteristic (see below).

As suggested above, diastatic activity is particularly high in germinating grain, and also in grain that has been damp enough to cause incipient germination. It can be improved in any flour, therefore, by the addition of malt preparations, or malt flour, which are manufactured from malted or germinated barley or wheat. It can often be considerably enhanced, also, by the addition of very small amounts of certain chemical salts such as ammonium phosphate, though the action of these mineral salt additions is not fully understood. Since any considerable excess of maltose will cause serious difficulties to the baker, making the dough sticky and the loaves difficult to bake through, an excess may be as harmful as a deficiency and, since there is no really effective practical cure for such an excess, malt additions must be made with care.

Further, owing to the variety of ways in which they may be prepared, malt preparations may vary widely in their characteristics—both in their diastatic and their proteolytic, or gluten softening, activities. These effects are not always properly understood, nor properly distinguished from gluten qualities. Consequently, there is a desire to avoid the use of such preparations; the baker feels that he is entitled to expect from the miller flours that do not compel him to employ such additions, and the miller is anxious to secure wheats that do not need any modification in this respect.

Nevertheless, such additions are often highly beneficial because the diastase of malt, as distinguished from that of flour, has a much greater capacity for attacking raw starch grains and effecting the liquefaction of the starch. Flour diastase is deficient in this respect, though it readily converts the liquefied starch to sugar. Since the ability to attack raw starch is the first step, and therefore the limiting factor, in maltose production, the use of malt in some form is often a definite advantage. Further, the softening of gluten by proteolytic enzymes that may be present in such preparations is sometimes helpful, especially with tough doughs, while they generally improve the flavour of the bread and the bloom of the crust. To secure these advantages, many bakers make some use of malt products.

The diastatic activity of any flour is, therefore, a distinct and highly important charateristic of the sample. It is capable of measurement by chemical methods in a simple way as follows:—Flour is incubated with water or an appropriate solution, but without yeast, at a normal dough temperature for a period of 1 hour, and the increase in maltose content determined by chemical analysis. Since it is the *rate* of maltose production that is important, nothing is gained by prolonging the time beyond 1 hour.

In the experimental work described below, the result is given as "maltose production in 1 hour," and the figures, which are in milligrams per 10gm. of flour, are equivalent to the number of lbs. of maltose that would be produced by 10,000lbs. of flour in 1 hour under these conditions. It is perhaps best to use this method of expressing the results to distinguish them from results obtained by other methods of determination. In a dough the rate of maltose production would differ from the result obtained in this way, but would still be in proportion to it, so that the figures serve to indicate the comparative rates at which sugar is made available to the yeast during the later and most important stage of the fermentation of doughs.

By comparing the figures obtained in this way with the results obtained by baking, it should be possible to say that gas production will be at a satisfactory level and the supply of sugar sufficient if the diastatic activity, measured in this way, falls between certain limits. From the data at present available it appears that the satisfactory range is from 230 to 330mgm. total maltose at one hour from 10gm. flour, though these limits must be regarded as tentative only, and to be confirmed by further experience. The comparatively low results returned by many Australian varieties may be seen and inferred from the tables in the next section, which contains a report of experimental work undertaken with the object of developing a test that could be used to secure data concerning the diastatic activity of the various lines obtained from any cross.

(*b*) EXPERIMENTAL.

Introduction.—Considering the low diastatic activity of Australian wheats as a whole, any method of improving them in this respect should be most valuable to the industry. If it is an inherited factor, it might be possible to effect improvement by selection during the development of a cross, provided that a suitable test was available, that is, one of reasonable accuracy that would be readily applicable to small samples of grain.

When first projected, the prospects of obtaining a test of diastatic activity adapted to wholemeal did not seem promising, because it appeared to be established that the enzymes were largely associated with portions of the grain other than those appearing in properly milled flour and, consequently, wholemeal should be much richer in enzymes than flour. Further, the consensus of opinion seemed to be that variations in this characteristic were almost entirely, if not wholly, environmental in origin.

To explore the possibilities, a few samples of grain were ground in a small mill, and the maltose production in the wholemeal was found to be of the same order as in flour. Two varieties in particular—Dundee and Ford—showed a large difference, though both were grown in the same group of plots under comparable conditions. Further samples of these two varieties were obtained and, while both showed a considerable range, none of the Dundee samples fell below 180mgm. while none of the Ford samples exceeded 150mgm. total maltose at 1 hour. It therefore seemed probable that diastatic activity, though widely influenced by environment, was also, to perhaps an even larger extent, a varietal characteristic.

Literature.—The problems associated with the diastatic activity of flour have received a great deal of attention in recent years, and the literature has been very completely reviewed by several authors, notably by Landis and Frey (1936). It will be sufficient to note papers that have an important bearing on present investigations.

Wood (1907), Humphries and Biffen (1907), and others, first showed the importance of gas production, and their work led to the wide adoption of malt supplements. Further progress awaited the development of an appropriate method of measuring diastatic activity in flours. Rumsey (1922) developed such a method, suitably related to conditions in the dough, and expressed the (autolytic) diastatic activity in terms of a new unit—the amount of maltose produced during the first hour of diastasis in flour suspensions. After a number of modifications, including the buffering of the suspension, it was finally developed to a high degree of accuracy and convenience by Blish, Sandstedt and Astleford (1932) and Blish and Sandstedt (1933). As used here, it has been applied to wholemeal without difficulty, and 8 determinations are completed in a few minutes over 2 hours.

The problem of whether diastatic activity was, in any degree, an inherited or varietal characteristic, was discussed by Mangels (1926), who demonstrated varietal influences. Landis (1934), however, surveyed the literature and concluded that all variations are due to environmental differences. Markley and Bailey (1934) state that varietal differences were noted. Coleman, Snider and Dixon (1934) concluded that "different varieties grown on the same soil series under the same climatic conditions do not differ in diastatic activity by more than 10 per cent." Swanson (1935) found that "Diastatic activity varies in different classes of wheats. It was found highest in durum wheats followed by spring (red) wheats. Some white wheats were found to be comparatively high and others to be low. Soft red winter wheats as a class were found to be lower than hard winter wheats." Nevertheless, Landis and Frey (1936) re-asserted that it is not a factor primarily inherent in a variety of wheat, and again, after reference to recent work, concluded "we must still conclude that diastatic activity is primarily an environmental factor and only secondarily influenced in magnitude by inherited characteristics."

The importance of environmental factors during the growing period of wheat is conceded by all authorities.

That the diastatic activity of the flour might be influenced by milling technique was demonstrated by Alsberg and Griffing (1925), Shollenberger and Coleman (1926), who also found that regrinding samples increased diastatic activity, and others. Kranz, cited by Brooke (1936), also confirms the effect of granulation.

Pascoe, Gortner and Sherwood (1930) found the diastatic activity of commercially milled flour to be about twice that of experimentally milled samples, and also that heavy grinding increased it; they thought the variations in the different streams of a mill to be associated with varying germ content, a conclusion previously suggested by Bailey (1925) and others.

More recently, such differences have been ascribed mainly to injury to the starch granules, making them less resistant to enzyme attack. Mangels and Martin (1935), state: "It is probable that most of the starch granules escape injury, but the small proportion which suffer injury may have an important effect on the diastatic activity." Kent Jones (1936) states that the maltose figure can to a large extent be controlled through the milling operation; further, that some mills do so little damage that the flours do not respond well when malt additions are made, while in others the damage may be so severe as to cause the flour to have much too high a maltose figure.

Standstedt and Blish (1933) and Markley and Bailey (1934) confirm the observation concerning the relation between experimentally milled and commercial flours, the latter adding that the diastatic activity of experimentally milled flours was correlated with that of commercially milled flours from the same samples, and also that tempering and conditioning wheat prior to milling influenced the diastatic activity, concluding that some condition of the surface of the particles brought about by tempering and milling, rather than granulation, was responsible. Kozmin (1933) showed that European systems of conditioning reduced diastatic activity. A conclusion to be drawn from all these observations is that the diastatic activity of any flour is greater than the natural diastatic activity of the sample, the increase being brought about in some way by the milling technique.

The enzyme activity of the germ and aleurone layer was thought to be higher than that of the endosperm. Evidence in support of this had been largely derived from studies of mill streams and by analogy with the barley grain (Bailey, 1925; Alsberg, 1935). That the differences in mill streams are mainly due to modification of starch granules is indicated above, and is confirmed by Swanson's (1935, 1936) studies of the enzyme activity of the germ and brush ends of the wheat grain; he found that maltose production in 1 hour was much the same for both, and nearly the same as that of whole wheat. Therefore, the presence of the germ, and probably the bran, does not invalidate the use of wholemeal for this determination.

The desirability of having a test of diastatic activity applicable to the raw material appears to have first been suggested by Blish and Sandstedt (1933). Markley and Bailey (1934) applied the test to "finely ground" samples of wholemeal and concluded that estimates based on this procedure regarding the diastatic activity of the flour were possible. Coleman, Snider and Dixon (1934) investigated the possibility of determining the diastatic activity of wholemeal. They carefully standardised their procedure but assumed, apparently, that fine grinding was essential; they specify reducing the sample gradually in three or more successive stages, to the "finest possible state of division." They concluded that a diastatic activity determination in wholemeal was quite practicable, but that a 5 per cent. error between duplicates could be expected. They did not compare their results with flours from the same wheats. Swanson (1935) also studied the effect of fineness of grinding, finding it to exert a decided influence, and concluded that grinding finer than 60 mesh wire sieve seemed to serve no useful purpose. Stellar, Markley and Bailey (1935) studied the relation between diastatic activities in experimentally milled flour and wholemeal "very finely ground in a steel burr mill" and concluded that "wheat samples may be *composited* with nearly as great reliability as flour samples" for this determination. Using composites of three individual samples from different locations, the maltose production in 1 hour averaged 135 units for their experimentally milled flours and 252 for the wholemeals, the correlation coefficient being .80 (1 per cent. point = .575). The range for flour was 94 to 246 units, and that for wholemeal was 209 to 315 units. Accepting the finding mentioned above that commercial milling gives approximately double the diastatic activity of experimentally milled flour, the results from commercial flour and wholemeal, ground in this way, would be of much the same order.

Materials.—To obtain suitable materials, arrangements were made with Messrs. Robins & Sons, Millers, of Marrabel, to supply samples of commercially milled flour, together with grain from which they had been milled, from the 1934 harvest, and four other similar pairs of samples (without added improvers) were obtained from current (1933) harvest production. The latter were commercial flours from blended wheats, while the former were all milled as single varieties (with the exception of one blended sample) in a small commercial mill. All are straight flours, this being the usual Australian milling practice. They were used to establish methods, and to determine the relationship between diastatic activities in commercially milled and wholemeal samples. The corresponding relationship with experimentally milled flours could not be determined as an experimental mill had not been installed here.

The study was continued by determining the diastatic activity of the wholemeal from the important varieties being used in the plant breeding plots, and also the samples obtained from the Ford Quality Survey of 1934. Finally the various lines obtained from certain crosses were examined.

Grinding Mill.—After trying different methods of grinding a No. O Universal grain mill, hand driven, was used throughout the study. This has chilled steel grinding plates, cut somewhat after the manner of old-fashioned stones, and the pressure between the plates is adjustable. To assist in securing uniformity of adjustment, a pointer was attached to the adjusting nut.

Preparation of Sample.—It was thought at first that some approximation to flour might be necessary to exclude as much as possible of the germ and bran. Samples were therefore thoroughly ground and the flour sieved off with bolting silks. Severe grinding was sometimes necessary to obtain an approximately 50 per cent. extraction, and the diastatic activity was always higher than in flour and increased with the severity of the grinding. Finally a method was adopted of alternately grinding and sieving until this extraction, or as near as possible to it, had been obtained. The 50 per cent. flour of Table III. was obtained in this way.

In the wholemeal samples, also, it was found that diastatic activity increased with more severe grinding and results were perhaps more easily reproducible when the samples were comparatively lightly ground. The possible causes of this variation were studied as follows: (1) To determine the effect, if any, of heating of the plates, a large sample was run through the mill operated continuously, and successive portions of the meal were examined. Though the plates were finally rather hot to the touch, no significant change in diastatic activity occurred: (2) A ground sample was passed through the mill five times, withdrawing a sample for examination after each passage; the diastatic activity steadily increased until it was 30 per cent. greater than in the original: (3) Samples of commercial flour were then taken and (*a*) passed twice through the closely set mill and (*b*) ground for 10 minutes with a heavy pestle in a rough Wedgwood mortar. The results obtained are given in Table I.

TABLE I.—*Effect on Diastatic Activity of Grinding Flour.*

Sample.	Total Maltose at One Hour, mgm/10gm.		
	Original Flour.	Twice through Grinder.	10 Minutes in Mortar.
A	192	292	228
B	155	230	176
C	168	246	184
D........	224	316	254

It is obvious that mechanical injury to the starch granules causes a material increase in diastatic activity, and overgrinding should be avoided if the maltose production *natural to the sample* is to be obtained. Further, the agreement between duplicates in wholemeals was found to be better with light grinding, especially when different individuals grounds them.

In view of these observations, the following method of grinding wholemeal was adopted:—20gm. of cleaned grain were passed through the mill with the plates set so that they just bite, and the material sifted on a 1mm. round hole sieve; the residue was returned to the mill and re-ground twice, the mill cleaned, and the material sieved, any residue being discarded. The pointer on the adjustment serves as an aid to uniformity of setting in successive grindings.

The reproducibility of results, using this method, was shown by the following test. Five operators, one of whom (D) had had no previous experience of grinding, were asked to set the mill and grind duplicate samples according to these instructions. As shown in Table II., the best results were obtained by C and E who had both had regular experience in grinding these samples, but all except D returned reasonably consistent results.

Thus the major part of the difference determined between any two similar samples arises from the grinding, but these results, and further tests of the same kind, indicate that differences due to grinding need not exceed approximately 5 per cent. when the same operator handles all samples.

TABLE II.—*Maltose Production in Wholemeal Ground by Different Individuals.*

Operator.	Maltose (total) at one hour, mgm/10gm.	
	Duplicates, First Grinding.	Duplicates, Second Grinding.
A	130 130	136 136
B	139 142	149 150
C	140 141	144 145
D	141 143	121 123
E	138 138	138 140

Maltose Production: Wholemeal v. *Flour.*

The results obtained in testing the 16 commercially milled flours together with the grain samples from which they had been milled are given in Table III. The sample Clarence has been excluded from the calculations because it is not a commercial variety, being a farmer's selection of unknown parentage; it ground extremely easily, producing an unusually light soft flour, and is not typical of our wheats.

TABLE. III.—*Maltose Production (total) in mgm/10gm, from Commercially Milled Flour, Wholemeal and 50 per cent. Flour, Marrabel District, 1933 and 1934 Seasons.*

Sample.	(A.) Commercially Milled Flour.	(B.) Wholemeal.	(C.) 50% Flour
Carrabin..	230	173	258
Dundee ..	306	270	450
Gallipoli .	162	150	181
Merredin .	184	167	201
Waratah .	178	159	174
Baldmin .	192	158	194
Florence .	224	189	288
Ex Florence	118	104	110
Ghurka...	169	128	152
Ranee ...	220	182	218
Blend, 50 per cent. Baringa	219	171	250
Flour A ..	190	176	200
Flour B ..	174	145	168
Flour C ..	204	180	246
Flour D ..	155	134	154
Clarence .	140	160	168
Averages	195	166	—

rAB = ·95 1 per cent. point = ·606.
rAC = ·95

The correlation coefficients between wholemeal and commercial flour, and also between 50 per cent. and commercial flour, are both .95. These are definitely higher than the corresponding correlations reported in the literature, and this is probably due to the comparatively light grinding used here, helped, perhaps, by the low level of diastatic activity in most of the samples and the fact that the commercial flours were specially ground in a small commercial mill that regularly produces straight flours.

There is nothing to choose between the two methods of obtaining the samples from the point of view of comparison with commercial flours, but the wholemeal procedure is, of course, much more convenient.

Light grinding appears to have a theoretical advantage. Maltose production depends upon two factors:—(1) the solubility, and ready access, of enzymes to the starch granules, and (2) the amount of modification the granules have suffered. From the point of view of plant breeding control at least, we are concerned primarily with the first factor only, since this indicates the *natural* diastatic activity of the sample, though varying degrees of susceptibility of starch granules to modification is probably a second factor.

Provided, then, that comminution is sufficient to permit the enzymes free play, lightly ground wholemeal should give a truer picture of the inherent maltose production of a sample than flour milled from it. In the latter, some granule modification always occurs, and this must raise the maltose figure beyond that which should be considered characteristic of the grain. Maltose production could probably be raised quite considerably above the natural level by modifications in milling technique.

Considering the flour samples tested as typical commercial flours, that is, that the granules have suffered a normal amount of modification, an estimate of the probable maltose production in a commercial flour can be obtained from that of the wholemeal, ground in this way, by employing the factor 195/166 or approximately 6/5. In other words, the maltose production in wholemeal is approximately 5/6th of that in the corresponding commercial flour. Probably this factor would vary with different mills.

Maltose Production: Comparison of Methods of Determination.—Many workers, particularly in Australia and England, have been using or are familiar with the Kent-Jones (1927) method of determining diastatic activity. Further, his conclusion—that a flour giving a maltose value between 1.5 and 2.3 per cent. will have a satisfactory diastatic activity—is widely accepted, though some consider that the former limit is, perhaps, a little too low.

Since the Blish-Sandstedt (1933) method used in these studies gives higher results that the Kent-Jones method, the exact relationship between them was determined by running a series of determinations on the same flours using the latter procedure. The results are given, together with those of the former method and the ratio between them, in Table IV. the figures stating total maltose at 1 hour, that is, no blanks were deducted in either case.

TABLE IV.—*Comparison of Diastatic Activities by Blish-Sandstedt and Kent-Jones Procedures.*

Sample.	Maltose Production Per cent. Kent-Jones.	Maltose, mgm/10gm. Blish-Sandstedt	Ratio, $\frac{\text{K-J} \times 100}{\text{B-S}}$
Carrabin	1·66	230	·72
Dundee	2·18	306	·71
Gallipoli	1·04	162	·64
Merredin	1·25	184	·68
Waratah	1·28	178	·72
Baldmin	1·40	192	·73
Florence	1·60	224	·71
Ex Florence	Below 1·0	118	—
Ghurka	1·20	169	·71
Ranee	1·60	220	·73
Blend (Baringa 50 per cent.)	1·59	219	·73
Flour A	1·34	190	·71
Flour B	1·24	174	·71
Flour C	1·45	204	·71
Flour D	1·06	155	·68
Clarence	1·01	140	·72
Average	—	—	·706

The principal differences in the methods are that the Kent-Jones procedure requires (*a*) digestion in water instead of a buffer solution, (*b*) a temperature of 27°C., instead of 30°C., (*c*) the completion of the determination with Fehling's solution instead of the ferrocyanide reagent, and (*d*) the results expressed in percentage instead of milligrams of maltose per 10gm. flour. There is, as illustrated in the table, good agreement between the methods and, for practical purposes, the results by one method may be converted into terms of the other by using the appropriate factor, that is, 0.7 x B-S = K-J, or 1.4 x K-J = B-S, and remembering the different units used.

Low Diastatic Activity of Australian Wheats.—As stated above, Kent-Jones has suggested that flours having a maltose production percentage between 1.5 and 2.3 are generally satisfactory. These limits would therefore correspond to approximately 210 and 320mgm./10gm. total maltose at 1 hour (blanks neglected). These figures include maltose originally present. It has been mentioned that the first figure is sometimes considered rather too low. Bailey (1930) has stated that a flour giving 200mgm./10gm. of maltose in 1 hour generally has a sufficient diastatic activity; to this, a blank of approximately 50mgm. must be added for maltose originally present to place it on a comparable basis with the limits given by Kent-Jones, or the figures given in this paper. It therefore appears that a flour should give, as a rule, a minimum of 230mgm. total maltose if it is to have an adequate gas production.

The figures shown in Table V. have been abstracted from various sources, as indicated, for the purpose of illustrating the results obtained from wheats grown in other countries, Kent-Jones's results being converted to mgm. units by means of the above factor.

The comparatively low values given by Australian wheats will be appreciated by comparing the data of Table V. with Table VI., which gives the results obtained from wholemeals from a number of representative varieties. All these samples were grown in College plots during 1935; the results are for mgm. total maltose, that is, no blank has been deducted, so that they are comparable with the figures given in Table V., if allowance is made for the result from wholemeal being ⅝ of that for the corresponding flour.

The Influence of Environment.

To demonstrate the extent to which environment may influence diastatic activity, advantage has been taken of a unique set of samples of the variety Ford. In 1934, small parcels of the same strain of this variety were distributed to farmers throughout the State who had volunteered to plant it within a commercial crop (by stopping a hoe of the drill and then planting the row with the Ford seed) and return the heads to the College. In all, 345 sam-

TABLE V.—*Maltose Production in mgm. Units of Representative Flours.*

Classification.	No. of Samples.	Average mgm.	Quoted from—
Northern Spring	2	225	Kent-Jones (1927)
Hard Winter	4	188	Kent-Jones (1927)
Manitoba I.	3	202	Kent-Jones (1927)
Manitoba II.	3	198	Kent-Jones (1927)
Manitoba III.	2	209	Kent-Jones (1927)
Manitoba VI.	2	299	Kent-Jones (1927)
Pacific Hard Federation	4	203	Kent-Jones (1927)
Durum	4	321	Kent-Jones (1927)
Indian	4	286	Kent-Jones (1927)
U.S.A. Hard Red Spring and Winter	23	300	Markley and Bailey (1934)
U.S.A. Commercial Flours	122	275	Davis and Worley (1934)
Canadian Bread Flours	25	266	Graesser (1936)

NOTE.—Since many values for European and Argentine flours are stated only approximately, exact values cannot be calculated; these are recognised as poor gassing wheats; basing an estimate on the literature, they probably range between 130 and 180mgm. for average samples.

TABLE VI.—*Maltose Production (total) of Wholemeals of Varieties from College Plots,* 1935 *Season.*

Variety.	Mgm.	Variety.	Mgm.	Variety.	Mgm.
Aussie	168	Gluyas Late	130	Nawab	123
Baringa (*a*)	220	Ex Gluyas	162	Nizam	123
Baringa (*b*)	200	Ex Gluyas	151	Onas	136
Bencubbin	152	Ex Gluyas	132	Penny	122
Caliph	113	Genoa	169	Pusa 4	200
Canberra	152	Ghurka	138	Quality	162
Carrabin	138	Gullen	194	Queen Fan	142
Cedar	178	Hard Federation	181	Ranee (*a*)	136
Comeback	152	Huguenot	212	Ranee (*b*)	145
Currawa	130	Kanred	123	Riverina	163
Dan	107	King's White	136	Sepoy	107
Daphne	110	Major	113	S.H.J.	176
Dawn	117	Marquillo	152	Sirdar	139
Dundee	196	Merredin	155	Sultan	142
Fay	123	Minister	171	Sword	130
Fan	117	Minflor	172	Ex Sword	171
Ford	110	Minflos	152	Ex Sword (short)	197
Ex Ford (S)	171	Nabawa	149	Ex Sword (tall)	155
Gallipoli	135	Noongaar	139		

NOTE.—Since diastatic activity is widely influenced by environment, the effect of seasonal conditions is probably considerable.

ples were returned and, after using the material for other tests, enough grain remained of nearly 250 samples to permit of maltose determinations being done. As these samples were grown in all wheat-growing districts, under rainfalls varying from 30 down to 10 inches, they should display the full effects of environment normally operating over a comparatively wide area. A fuller discussion of these Ford samples will appear in a later paper in this series, but the results may be briefly summarised as follows:—The extreme range of the samples, in mgm./10gm. total maltose at 1 hour, was from 70 to 170, while about 80 per cent. fell between 90 and 140; the higher testing samples came from districts with a higher rainfall and milder finishing conditions.

Since the *raison d'etre* of the whole of this work rests entirely on the probability, established above, that diastatic activity is, to some important extent, an inherited factor, the further evidence of this that has accumulated during the course of this work might now be reviewed.

Heredity v Environment.—Of some 250 samples of Ford that have been examined, representing all differences in environment experienced within this State, very few have exceeded 150mgm. On the other hand, of about a dozen samples of Dundee, none returned less than 170mgm., while two exceeded 300mgm. Of some 6 samples of Baringa, none returned less than 150mgm.

The variability of a given variety under the same environment is indicated by another series of Ford samples. A number of lines had been selected from Ford, which had been an established variety for about 15 years, and were grown with checks of Ford in a small block of plots. These lines show differences in other characteristics, particularly in their wholemeal fermentation test numbers, as previously reported in this *Journal* (Breakwell, 1934; Hickinbotham, 1934). Of these, 9 checks and 19 lines were examined for total diastatic activity. The checks ranged between 108 and 120mgm. with a mean of 114mgm., while the lines ranged from 111 to 137mgm., with a mean of 122mgm. Since these latter represent different lines, the variation shown will exceed the normal variation of the variety under this particular environment. The varieties listed in Table VI. were grown in the same series of plots, so that these three groups must be considered as having experienced the same environment. The importance of variety is clearly emphasised when these results are tabulated (Table VII.)

These results clearly suggest (1) that a pure line has an inherited diastatic activity which tends to be constant under a given environment, and (2) that different varieties have widely different diastatic activities under the same environment.

Since the strain of Ford under consideration and Dundee represent extremes in diastatic activity, it would be interesting to examine the lines from a Ford-Dundee cross, but as no such cross of even maturity was available, 24 lines of a Sword-Dundee cross were tested. The range was found to be from 130 to 234mgm.; that is, the extremes corresponded approximately to what would be expected from the two parents grown under similar conditions, while the individual lines were distributed throughout the range. The distribution is shown in Table VIII.

TABLE VII.—*Range in Maltose Production of different Groups—All Samples Grown in the same Series of Plots.*

Group.	No. of Samples.	Lowest Maltose.	Highest Maltose.	Range of Group-Maltose.
Ford, one pure line	9	108	120	12
Ford, separate lines	19	111	137	26
Varieties (Table VI.)	57	107	220	113

TABLE VIII.—*Maltose Production (total) in mgm/10gm. at One Hour of 24 Lines from a Sword-Dundee Cross.*

Mgm. Maltose intervals ..	130 to 149	150 to 169	170 to 189	190 to 209	210 to 229	230 to 249
No. of lines.............	5	7	7	4	—	1

Bearing in mind the confusion that has existed between diastatic activity and "strength" it is also relevant to note that all the varieties recognised as being of good baking quality are comparatively high in maltose production (see Tables III. and VI.). Thus, considering results obtained for wholemeals, Pusa 4 (200), Carrabin (173, 138), S.H.J. (176), Florence (224), Quality (162), Dundee (270, 196), Riverina (163), Hard Federation (181), Minister (171), and Cedar (178) are all generally recognised as being medium strong to strong, while Baringa (220, 200) and Ford (110) have both been the subjects of much controversy.

Conclusion.—Summing up, these results provide strong support for the conclusion that marked inherited differences in diastatic activity do occur, and that, in wheats similar to those grown here (that is, white spring wheats) at least, heredity is as important as environment as a determining factor in any sample.

Consequently, the development of this test for diastatic activity in wholemeal, from which the behaviour of the flour may be predicted with considerable confidence, is justified since it may place in the hands of the plant breeder a method of controlling this factor in baking quality.

It should be useful to the miller as an aid in choosing the components of a blend.

Again, still greater significance will be attached to variety if the conclusion suggested by these data—that variety is at least as important as environment—is confirmed by further study.

Finally, the necessity for standardising the maltose production of flours for test baking purposes, especially in Australian wheats, is emphasised, for very few of the varieties listed here would give any useful indication of their true "strength" with the usual test baking procedures. This is obviously of paramount importance when baking experimentally milled flours, which have been shown by others to have only approximately one-half of the diastatic activity of commercially milled flours from the same grain.

In view of the effects of heavy grinding, however, it is probable that modifications in milling practice to increase the miller's control over the diastatic activity of the flour will be introduced. It is possible that such a development might greatly reduce the importance of inherited diastatic activity, but, since the quantity of enzymes would most probably not be affected by such modifications, but only the injury to granules, and since over-grinding may adversely affect other characteristics, it is probable that the natural diastatic activity of a variety will remain a matter of importance.

SUMMARY.

The data presented suggest that heredity is at least as important as environment in determining the diastatic activity of wheat, and, consequently, a test of maltose production applicable to wholemeal, and having a predictive value for flour, should be definitely useful in plant breeding control. Such a test is described.

For such a purpose, however, the wholemeal should be comparatively lightly ground, because over-grinding increases the apparent diastatic activity of the flour. By light grinding a nearer approximation to the natural diastatic activity of the sample is obtained.

Factors are derived for converting results from Rumsey (or Blish-Sandstedt) units to Kent-Jones percentages and *vice versa.*

The results tabulated demonstrate the low diastatic activity of Australian wheats.

The possible applications of the test are briefly indicated.

ACKNOWLEDGMENTS.

Indebtedness is acknowledged to Dr. A. R. Callaghan for interest in this work; E. J. Breakwell, Plant-breeder, for much of the material used in this study; E. M.

Hutton, Assistant Plant-breeder, for carrying out most of the analyses of Table VI.; and, especially, Messrs. Robins & Sons, and also Mr. McLean, of Noske's Ltd., for providing specially milled samples of commercial flour and grain.

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(To be continued.)

Royal Show—Bureau Section Won by Balhannah

The picture on the cover of this issue illustrates a portion of the exhibit entered by the Balhannah Branch of the Agricultural Bureau in the Bureau section at the Adelaide Royal Show and all Branches will heartily congratulate this Branch on its outstanding success.

The Royal Agricultural Society increased the prize money this year for the Bureau section to £400, and excellent entries were made by Balhannah, Strathalbyn, and Mount Barker branches. The competition was for a district exhibit to be entered and staged by members of a branch of the Agricultural Bureau and restricted to the produce of the farms of members of that branch.

ORGANISING THE EXHIBITS.

Balhannah secured first place with an exhibit which was unquestionably the best effort which has ever been made by branches in this section. This branch had won prizes at previous Shows, and was thoroughly organised for this year's exhibit, the preparations for which were commenced immediately after the 1935 Show. The Committee consisted of Messrs. C. W. R. James (Chairman), H. N. Wicks (Chief Convenor), and E. W. Mattner (Secretary), and the following were the sectional convenors:—Messrs. V. R. Norsworthy (cereals), J. R. Pfeiffer (hay, chaff, etc.), G. G. Pitt (wool), H. A. Spoehr (dairy produce, &c.), H. L. Pfeiffer (green fodders, &c.), V. R. Norsworthy (other grains and seeds), F. Leane (pickles, sauces, &c.), S. H. Grivell (vegetables and roots), H. N. Wicks (drinks), C. W. R. James (produce not otherwise mentioned), and A. G. Middleton (home devices). These convenors obtained helpers from the ranks of Bureau members, who all assisted in some way. Arrangements for carting were in the hands of Messrs. H. B. Pitt, L. Nagel, and others, who used their cars and buckboards for the purpose.

The staging was designed by Mr. Wicks, and built by Messrs. F. T. and V. R. Norsworthy. A design was submitted to the builders early in the year, and a model was submitted to a general meeting for approval. A plan was then made to scale, and as lists were submitted to the Chief Convenor, the location of the items was set out on the plan. This entailed a knowledge of the actual dimensions of each article, including the base measurements of each of the pots and bottles of which there were hundreds. The decoration scheme was in the hands of Mrs. H. N. Wicks, and the shelves were lined with white paper edged with a two-colour ribbon made up of black and red crepe paper.

Convenors were responsible for the staging of their respective sections on the space allotted under the direction of the Chief Convenor, and both the staging and dismantling took place without a hitch.

The electric lighting was in the hands of Mr. Wicks, who installed the automatic flashing switch which worked the signs on the sections and the floodlights. Altogether, there was 30 electric points, and 900ft. of wiring. Mr. Wicks also installed his cinema (exclusively his own production) which, at intervals, depicted most of the industries represented in the exhibit.

There were 1,527 items in the exhibit, not taking into account individual varieties of fruits, &c. For instance, there were 6 or 7 apples in each variety and this applied to other fruits, the export case was classed as one item, and there was 12 to 15 exhibits in hams also counted as one. The number of items in each section was as follows:—Cereals (grain and in sheaf), 55; hay, chaff, and silage, 41; wool, 25; dairy produce, bacon, hams, eggs, lard, dripping, &c., 109; green fodders, grasses, &c., 115; all other grains and seeds, 120; fruits (fresh and preserved), pickles, sauces, jams, and honey, 414; vegetables and roots, 100; drinks (including wine), 44; produce not otherwise specified, 250; home-made devices, 254. The latter included an attractive fence which is shown in the front portion of the photo., and which consisted of 44 different varieties of timbers grown in the district.

At a recent meeting of the Advisory Board of Agriculture, Mr. Wicks was asked to convey to members of the Women's and Men's branches at Balhannah the Board's congratulations on the success achieved at the Show. It was considered by Board members that there were many districts from which worthy exhibits could be entered, and they expressed the hope that next year would see greater competition in the Bureau section.

It is understood that the Balhannah branch has decided not to compete in this section next year.

Question Box.

Questions discussed at a meeting of Lenswood Branch included the following:—*Should Jonathan trees which have borne a large crop be winter sprayed (Red Oil) this year or next?* The general feeling was to miss the first year and spray in the following year when a large crop was again expected. *Is passion fruit a profitable sideline?* Passion fruit should be grown on the eastern side of a shed. Several members were doing well with them planted in that position. *Should manure and peas be put in the same drill?* It was better to broadcast the manure and plough it in before sowing the peas. Peas only 2in. above ground would have roots extending 6in. each side; therefore broadcasting the manure was preferable. *Which is the best method of clearing land, gelignite, tree-puller, or tractor?* Opinion was divided. Members considered that all stumps should be dead at least 2 years before clearing. *At what time of the year should apples be thinned out?* When the fruit was about one-third grown. At that stage any spotted, codling infested or deformed apples could be clearly seen and removed first.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of September, 1936; also the average precipitation for September, and the average annual rainfall.

Station.	For Sept., 1936.	Av'ge. for Sept.	To end Sept. 1936.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	—	0·30	2·19	4·62
Marree	—	0·44	2·77	5·83
Farina	—	0·46	2·88	6·37
Copley	—	0·64	3·54	7·85
Beltana	—	0·73	4·02	8·47
Blinman	0·07	1·05	4·91	11·81
Hookina	0·11	0·95	6·64	11·18
Hawker	0·08	1·13	6·85	12·22
Wilson	0·21	1·07	8·13	11·77
Gordon	0·15	0·96	5·35	10·46
Quorn	0·38	1·30	6·39	13·15
Port Augusta	0·10	0·92	6·01	9·40
Bruce	0·08	0·96	8·97	9·74
Hammond	0·12	1·17	7·17	11·11
Wilmington	0·67	1·89	13·32	17·28
Willowie	0·18	1·41	7·18	12·22
Melrose	1·15	2·47	17·37	22·85
Booleroo Centre	0·30	1·68	9·03	15·21
Port Germein	0·35	1·28	7·45	12·53
Wirrabara	0·62	2·17	10·21	19·25
Appila	0·58	1·66	9·00	14·62
Cradock	0·23	1·01	6·06	10·78
Carrieton	0·22	1·18	7·46	12·19
Johnburg	0·06	1·08	7·29	10·56
Eurelia	0·29	1·33	7·80	12·76
Orroroo	0·26	1·26	8·85	13·20
Nackara	0·07	1·14	13·64	11·09
Black Rock	0·16	1·25	8·21	12·35
Oodlawirra	0·04	1·28	9·66	11·67
Peterborough	0·11	1·42	8·59	13·22
Yongala	0·30	1·58	10·77	14·43
NORTH-EAST				
Yunta	0·08	0·72	6·22	8·84
Waukaringa	0·09	0·66	6·18	7·89
Mannahill	0·09	0·59	4·80	8·16
Cockburn	0·12	0·60	6·37	7·91
Broken Hill	0·26	0·74	6·27	9·50
LOWER NORTH.				
Port Pirie	0·47	1·39	9·05	13·19
Port Broughton	0·32	1·52	7·42	13·85
Bute	0·43	1·63	8·92	15·39
Laura	0·81	2·14	11·07	17·97
Caltowie	0·71	2·00	9·68	16·76
Jamestown	0·54	2·11	10·75	17·72
Gladstone	0·41	1·94	8·92	16·32
Crystal Brook	0·46	1·74	8·98	15·76
Georgetown	0·46	2·14	10·37	18·29
Narridy	0·31	1·80	8·00	15·77
Redhill	0·29	1·79	11·82	16·54
Spalding	0·39	2·41	10·02	18·74
Gulnare	0·33	2·27	10·70	18·59
Yacka	0·25	1·76	10·03	15·38
Koolunga	0·22	1·63	8·35	15·32
Snowtown	0·23	1·68	10·65	15·70
LOWER NORTH—*continued.*				
Brinkworth	0·27	1·88	8·44	15·73
Blyth	0·46	1·94	11·13	16·73
Clare	1·20	2·86	18·61	24·45
Mintaro	0·76	2·94	15·94	23·36
Watervale	0·99	3·15	19·69	26·74
Auburn	0·69	2·82	16·46	23·96
Hoyleton	0·67	1·95	13·46	17·27
Balaklava	0·30	1·69	8·55	15·43
Port Wakefield	0·46	1·27	7·91	12·93
Terowie	0·28	1·48	11·15	13·34
Whyte-Yarcowie	0·14	1·54	11·44	13·58
Hallett	0·54	1·92	10·95	16·41
Mount Bryan	0·45	2·20	11·79	16·77
Kooringa	0·53	2·08	11·80	17·81
Farrell's Flat	0·40	2·17	14·23	18·54
WEST OF MURRAY RANGE.				
Manoora	0·65	2·37	12·85	18·94
Saddleworth	0·80	2·25	15·01	19·59
Marrabel	0·79	2·34	14·28	19·96
Riverton	0·88	2·40	15·36	20·79
Tarlee	0·94	2·11	12·54	18·09
Stockport	0·55	2·04	12·22	16·97
Hamley Bridge	0·49	1·92	10·48	16·52
Kapunda	0·68	2·22	12·99	19·76
Freeling	0·71	2·01	10·24	17·79
Greenock	0·86	2·56	13·76	21·47
Truro	0·41	2·32	12·50	19·79
Stockwell	0·55	2·32	13·18	20·04
Nuriootpa	0·81	2·39	14·92	20·68
Angaston	0·67	2·61	15·18	22·32
Tanunda	0·71	2·52	14·40	21·94
Lyndoch	0·97	2·84	12·30	23·27
Williamstown	0·67	2·98	14·90	27·61
ADELAIDE PLAINS.				
Owen	0·24	2·04	11·48	14·64
Mallala	0·44	1·84	9·69	16·49
Roseworthy	0·52	2·00	9·99	17·42
Gawler	0·51	2·04	10·65	18·85
Two Wells	0·31	1·59	9·21	15·76
Virginia	0·31	1·79	10·84	17·20
Smithfield	0·53	2·05	10·82	17·65
Salisbury	0·68	1·91	9·58	18·56
Adelaide	0·67	2·09	12·79	21·14
Glen Osmond	1·05	2·78	15·18	25·97
Magill	0·95	2·74	13·42	25·37
MOUNT LOFTY RANGES.				
Teatree Gully	0·70	3·02	12·75	27·07
Stirling West	2·53	5·18	29·09	46·95
Uraidla	1·92	4·91	24·63	43·95
Clarendon	1·90	3·54	21·35	32·79
Happy Val'y Res.	1·00	—	15·39	—
Morphett Vale	1·03	2·53	13·72	22·59
Noarlunga	0·79	2·27	13·56	20·33
Willunga	1·50	2·82	15·39	25·97
Aldinga	0·95	2·29	12·83	20·21

RAINFALL—*continued.*

Station.	For Sept., 1936.	Av'ge. for Sept.	To end Sept., 1936.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	1·24	3 77	17 93	29 42
Inman Valley	1·37		19·83	—
Yankalilla	1 18	2·51	14·59	22·76
Mount Compass	1·99	4·66	22 27	—
Mount Pleasant	0·85	3·27	18·43	27·11
Birdwood	0·93	3·43	16 52	29·07
Gumeracha	1 12	3·77	16·82	33·31
Millbrook Res.	1 15	4·31	17·88	34·47
Lobethal	1·80	4 23	21·14	35·91
Woodside	1·35	3·95	17·72	32·15
Hahndorf	1·87	4·21	19·24	34·77
Nairne	1·21	3·40	17·14	28·12
Mount Barker	1·49	3·66	18·80	31·24
Echunga	1·90	3·92	22·74	33·25
Macclesfield	1·50	3·79	20·54	30·34
Meadows	2·13	4·40	23·70	36·02
Strathalbyn	1·17	2·24	14·72	19·32
MURRAY FLATS AND VALLEY.				
Meningie	0·66	2·06	12·68	18·31
Milang	0·69	1·56	11·97	14·89
Langhorne's Ck	0·95	1·69	12·96	14·91
Wellington	0·60	1·63	12·16	14·65
Tailem Bend	0·61	1·92	13·29	15·06
Murray Bridge	0·56	1·59	11·51	13·51
Callington	0·65	1·84	10·93	15·15
Mannum	0·23	1·31	9·65	11·48
Palmer	0·22	2·13	14·10	15·59
Sedan	0·06	1·37	8·29	12·05
Swan Reach	0·16	1·33	7·95	10·65
Blanchetown	0·02	1·02	8·18	11·01
Eudunda	0·57	1 94	13·94	17·15
Point Pass	0·60	2·39	15·04	16·72
Sutherlands	0·06	1·23	8·62	10·81
Morgan	—	0·99	6·52	9·16
Waikerie	0·12	1·09	9·32	9·66
Overland Corner	0·05	1·12	8·62	10·25
Loxton	0·25	1·40	8·91	11·50
Berri	0·19	1·23	9·03	10·13
Renmark	0·16	1·21	10·10	10·38
WEST OF SPENCER'S GULF.				
Eucla	0·18	0·76	6·03	10·02
Nullarbor	0·04	0·57	4·18	8·85
Fowler's Bay	0·14	0·90	7·64	11·19
Penong	0·17	1·04	7·55	12·22
Koonibba	0·13	1·05	7·54	12·09
Denial Bay	0·19	0·88	7·73	11·19
Ceduna	0·15	0·90	6·88	10·21
Smoky Bay	—	0·92	6·26	10·42
Wirrulla	0·05	1·22	5·25	10·51
Streaky Bay	0·24	1·35	8·63	14·85
Chandada	0·09	1·30	6·01	12·42
Minnipa	0·30	1·35	8·45	13·91
Kyancutta	0·19	1·41	8·18	12·77
Talia	0·22	1·67	8·24	14·76
Port Elliston	0·49	1·47	8·76	16·51
Lock	0·50	1·76	9·09	16·34
Mount Hope	0·56	—	10·63	—
Yeelanna	0·30	1·86	9·27	15·94
Cummins	0·30	2·01	9·92	17·58
Port Lincoln	0·58	1·97	11·26	19·37
Tumby	0·22	1·69	8·18	14·25
Ungarra	0·46	2·12	9·95	16·87
Port Neil	0·44	1·56	7·64	13·11
WEST OF SPENCERS GULF—*continued.*				
Arno Bay	0·32	1·53	6·48	12·71
Rudall	0·22	1·46	7·11	12·98
Cleve	0·50	1·69	8·78	14·88
Cowell	0·38	1·18	7·76	11·07
Miltalie	0·48	1·49	8·49	13·70
Mangalo	0·28	1·59	10·13	13·86
Darke's Peak	0·44	1·82	8·56	15·08
Kimba	0·23	1·25	5·52	11·68
YORKE PENINSULA.				
Wallaroo	0·37	1·34	7·88	13·97
Kadina	0·27	1·56	7·92	15·60
Moonta	0·29	1·41	7·01	15·06
Paskeville	0·29	1·59	11·36	15·47
Maitland	0·50	2·05	10·07	19·85
Ardrossan	0·46	1·51	7·96	13·95
Port Victoria	0·39	1·59	7·62	15·41
Curramulka	0·54	1·93	9·91	17·81
Minlaton	0·51	1·88	9·84	17·74
Port Vincent	0·97	1·79	8·00	14·38
Brentwood	0·67	1·77	8·41	15·54
Stansbury	0 53	1·94	9·70	16·81
Warooka	0·69	1·88	9·74	17·44
Yorketown	0·73	1·89	9·06	16·83
Edithburgh	0·64	1·81	8·71	16·37
SOUTH AND SOUTH-EAST.				
Cape Borda	0·76	2·17	17·93	24·80
Kingscote	1·06	1·87	11·29	19·16
Penneshaw	1·55	2·21	13·07	19·00
Victor Harbour	0·73	2·41	14·27	21·40
Port Elliot	0·74	2·24	15·06	19·94
Goolwa	1·03	1·93	14·40	17·86
Maggea	0·23	1·23	9·65	10·20
Copeville	0·26	1·54	11·57	11·53
Claypans	0·11	1·19	10·02	10·42
Meribah	0·22	1·47	10·41	11·32
Alawoona	0·19	1·15	9·95	10·40
Caliph	0·21	0·89	9·12	10·98
Mindarie	0·27	1·60	16·93	12·23
Sandalwood	0·50	1·66	11·96	13·64
Karoonda	0·47	1·75	11·63	14·17
Pinnaroo	0·26	1·71	10·45	14·36
Parilla	0·60	1·80	11·12	13·72
Lameroo	0·64	2·06	11·90	15·87
Parrakie	0·45	1·89	10·62	14·56
Geranium	0·63	2·06	11·17	16·36
Peake	0·45	1·96	10·62	15·93
Cooke's Plains	0·70	1·84	12·75	15·28
Coomandook	0·56	2·03	12·18	17·03
Coonalpyn	1·23	1·99	13·76	17·61
Tintinara	0·99	2·19	13·59	18·62
Keith	0·77	2·24	13·49	17·93
Bordertown	1·24	2·20	13·80	19·14
Wolseley	1·21	2·23	13·81	18·47
Frances	0·91	2·32	15·54	20·08
Naracoorte	1·26	2·60	15·95	22·63
Penola	1·62	2·81	17·01	25·96
Lucindale	1·81	2·53	19·42	23·38
Kingston	1·17	2·36	18·60	24·24
Robe	1·26	2·21	18·50	24·64
Beachport	1·18	2·38	21·58	27·06
Millicent	2·74	2·97	25·04	29·83
Kalangadoo	2·28	3·53	23·19	32·20
Mount Gambier	2·16	3·10	20·67	30·37

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East, 28th August, Discussion—Congress; Appila, 1st September, ''The Percheron Horse''—A. J. Melrose, M.P.; Arthurton, 20th August, ''Tree Planting''—C. Hicks; Barmera, 17th August, Annual Meeting; Baroota, 10th August, Discussion—''Itch in Horses''; Beetaloo Valley, 24th August, Combined Meeting, ''European Countries''—Mr. Pines, Social and Dance; Blackheath, 3rd September, Discussion; Black Springs, 1st September, Discussion—Congress; Blackwood, 14th September, ''Black Spot Control''—J Turner; Blewitt Springs, 1st September, Address—H. H. Orchard; Boor's Plains, 31st August, ''Cleaning a Magneto''—M. D. Wright; Brownlow, 2nd September, ''Livestock Feeding''—F. W. Roocke; Buchanan, 14th September, Congress Reports; Cambrai, 3rd September, Papers (3); Cherry Gardens, 28th August, Discussion; Chilpuddie Rock, 2nd September, Discussion—Congress, Coomandook, 27th August, ''Wool Classing''; Coonalpyn, 26th August, Discussion, Devlin's Pound, 25th August, Annual Meeting; Dudley, 1st September, ''Fat Lamb Production''—L. A. Longbottom; Eurelia, 26th August, ''History of the Eurelia Branch''; Frayville, 30th July, Adresses, 3rd September, Discussion; Greenock, 20th July, Annual Meeting, 24th August, Question Box; Hanson, 1st September, ''Farming in Soviet Russia''—C. A. S. Hawker, M.H.R.; Hilltown, 1st September, Question Box; Inman Valley, 24th September, Address, ''Fodders''—R. Hill; Ironbank, 2nd September, ''Apple Packing''—Mr. Gregory, 8th September, ''Black Spot''—M. Basey; Jamestown, 24th August, ''Bees''—J. Masterman; Kyancutta, 1st September, Discussion—Congress; Lameroo, 18th September, Congress Reports; Laura Bay, 14th July, Annual Meeting, 4th August, Discussion; Lenswood and Forest Range, 31st August, Conference Report; Light's Pass, 31st August, Address—W. G. Ahrens; Lobethal, 17th September, Address—C. A. Goddard; Lyndoch, 1st September, Lantern Lecture—Vacuum Oil Co.; MacGillivray, 23rd July, Addresses, R. Wheaton and D. Riceman, 1st September, Discussion—Congress; Marama, 31st August, Discussion—Congress; McLaren Flat, 24th September, ''Glass Making''—A. Trembath; Meadows, 1st September, ''Care of Eggs''—C. Carroll and E. L. Osborn; Millicent, 28th August, ''Pastures''—Mr. Kemp; Monarto South, 19th September, Congress Report; Morchard, 28th August, ''Farm Shearing Shed''—A R. Lang, ''Noxious Weeds''—B. McCallum; Mount Hope, 25th August, ''Destruction of Mallee''—H. H Myers; Murraytown, 19th September, Congress Report; Mypolonga, 10th August, Discussion; Narridy, 19th September, ''A World Tour''—Mr and Mrs. J. W. Eagle; Nunjikompita, 3rd September, ''Care of Farm Harness''—V. Pascoe; Paskeville, 1st September, ''Insurance''—J. Prouse; Penwortham, 24th August, ''Petrol Engines''—Max Bryant; Pygery, 1st September, Formal; Red Hill, 25th August, ''Improving Butter Quality''—J. O. Hatter; Rosedale, 31st August, ''Chick Sexing''—A. O. Dawkins; South Kilkerran, 7th September, Paper from *Journal*; Springton, 2nd September, ''First Aid''—F. R. Johnstone; Sutherlands, 3rd September, ''Drought Preparations''—E. R. Schiller; Tantanoola, 29th August, Discussion—Congress; Truro, 22nd September, Address—W. C. Johnston; Upper Wakefield, 27th August, Papers—J. Cleary and J. Ryan; Waikerie, 14th September, ''Tipping and Disbudding of Vines''—J. Wuttke and W. Francis; Wandearah, 25th August, Woolclassing—C. A. Goddard; Warcowie, 1st September, ''Colt Breaking''—R. A. Jarvis, 23rd September, ''Noxious Weeds''—G. H. Clarke; Wasleys, 6th August, ''Malting Barley''—S. G. Barrett, 2nd September, Address—W. J. Spafford; Weavers, 31st August, Address—S. M. Anderson; Yadnarie, 1st September, ''Pasture Improvement''—E. A. Spriggs.

The Care of Young Fruit Trees from before Planting up to the Second Pruning.

[Paper read by H. WHILLAS at a meeting of Green Patch Branch on 30th July.]

WHAT TO DO WITH YOUNG TREES WHEN RECEIVED FROM NURSERY.

Packages should be removed, and trees trenched or heeled in damp ground—not wet—about 10 trees to a trench, 3ft. x 1ft. Wind and frost must not get to the roots. The best distance to plant trees is 20ft. apart on the straight and square methods. They can then be worked from four different angles with horses, leaving very little to be done by hand.

PREPARING THE HOLES.

The holes should not be dug until the planter is ready to plant the trees, as holes left open in wet weather become full of water, thus making them unfit for planting. The size of the hole should be about 3ft. square and 8in. to 1ft. deep. Bonedust and superphosphate can be mixed with soil—1lb. or 2lbs. bonedust, less if super is used.

TRIMMING ROOTS.

Before planting the roots of the young tree must be trimmed, and all broken small dead fibrous roots removed. If a tree is planted without pruning the shrivelled roots, on being dug up in 12 month's time and examined, scarcely any new extensions will be found to have issued from the smaller ones; just in the same manner as when the top of a young tree is left unpruned many of the partly-matured terminal twigs will die, and fresh ones emerge from the more solid wood below.

PLANTING AND WATERING IF SOIL IS NOT DAMP ENOUGH.

Throw a few spadefuls of good top soil mixed with bonedust and superphosphate into the hole, making the soil form a little hill in the centre. Now place tree on the hill, spreading roots around evenly as possible. Throw in soil, spreading it evenly around the roots until the hole is nearly full. Then take the tree by the main stem with one hand, gently pulling up, while pressing down with feet. Fill hole up to a little more than ground level. Stake and water if not damp enough.

PRUNING.

First Pruning.—If the first branches are more than 18in. to 20in. from the ground prune back to three good buds evenly distributed. If there are plenty of branches cut the centre ones out, leaving three or four of the best-spaced ones with two of the end buds facing sideways to form the secondary arms next season.

Second Pruning.—The tree that was left with three arms after the first pruning can be left with six arms which form the secondary arms. Prune to buds facing outwards.

THE USES OF PRUNING.

Pruning increases the length of life of the tree by adding to the vigour of root and leaf action. It renders the tree less liable to disease and attacks of insect pests. It conforms the tree to a shape and size that is more convenient to cultivate around, spray, prune, and pick fruit from. It increases the size, colour, and quality of the fruit, thus making it far more valuable. In addition it causes the tree to bear regular crops of fruit instead of bearing alternate seasons.

CARE THROUGH SPRING AND SUMMER.

Young trees should be well worked and cultivated, and watered about once a month if there is not sufficient rain. All superflous shoots which may rise from the centre or main stem of the tree should be thinned out.

To what extent can the Area of Fallow and Working of Same be Reduced by the Keeping of Sheep?

[A. T. COWLEY, Roberts and Verran.]

It is generally understood that in order to make farming pay a number of sheep must be run on the farm in conjunction with wheat growing; either line without the other appears to be impracticable.

The keeping of sheep on most of the country in our district would be impossible without any cultivation of the land. Having worked the land it is generally considered the correct thing to grow a saleable crop on it before allowing it to lie out for grazing. After the sown crop is harvested we expect the same land to grow more and better sheep feed for the next year—or even two years—on account of the cultivation of the land when being prepared for the grain crop, and the addition of superphosphate to the soil when the crop is sown.

In order that the sown crop—if wheat for grain, or any cereal for hay—should yield the best possible crop it is necessary to fallow the land, and to have the fallow correctly worked.

On a farm where 400 or more acres per annum are sown for grain or hay it is desirable that the greater proportion of this area—shall we say 300 acres?—should be fallowed, and that the fallow should receive workings between the time of the original ploughing and its being sown.

The sheep-carrying capacity of a farm depends mainly upon the area remaining not cropped and not fallowed in any one year on land sufficiently well cleared to allow grass or other feed to grow.

More room can be left for sheep by reducing the area to be cropped in any one year, but as the land cropped during the previous year usually yields the greatest volume and best quality of feed, the sheep-carrying capacity of the farm over a series of years would be reduced rather than increased by this practice.

We want to keep more sheep and to increase our profits from sheep. Can we do it by sowing crops especially for sheep feed, by top dressing natural pastures, or by reducing the area to be fallowed in order to have more grassland available without reducing the area under crop? We may be able to do any, or all of these. Let us for the moment limit our consideration to the possibilities of reducing the area of fallow and reducing the number of cultivations of fallowed land.

Supposing that of our normal area of, say, 300 acres, we leave 100 to grow extra sheep feed, the said 100 acres to be sown in the following year in order to keep to our full area of sown crops. If it were sown to wheat for grain could the extra profit received from sheep by having it under grass be expected to make up for the reduced value of the crop grown upon it? If so, would we have time, and expect to have the land in suitable condition, to plough and prepare it for seeding after harvest?

Further, would the loss of "rest" which fallowing would give it, and the lack of extra workings in the spring reduce the sheep-carrying capacity of that 100 acres during the year succeeding the cropping? If so, would this loss amount to more than we would have by not having had this 100 acres to cultivate in the spring? (or between fallowing time and the time between harvest and seeding, when it would be ploughed?) Further, could we avoid a possible loss due to reduced value of wheat grown on unfallowed land by sowing a crop especially for sheep feed and keeping extra sheep to the carrying capacity of that 100 acres? If the sheep feed crop were sown with as much super as would be used for wheat, the sheep-carrying capacity in the following, or lying-out, year should not be reduced, but rather should be increased on account of the return to the soil of the droppings of the grazing animals.

In the case of newly-cleared land, the foregoing question may be said not to apply for at least the first five years, for such new ground grows little, if any, natural feed, and the working required during that period would not be affected to any appreciable extent by the running of sheep upon it, although the presence of sheep should certainly have a beneficial effect upon the condition of the land, and should increase the crop-growing and sheep-carrying capacity in these and subsequent years.

I submit that after the first ploughing of the fallow further cultivation may be reduced to half of the number of workings that would be required without the aid of sheep. Sheep will do all the packing that is necessary to consolidate and eliminate air pockets in most of the soil. One or two light workings may be necessary, in order to loosen up the surface, prevent evaporation of moisture, and to kill weeds not liked by sheep, if these exist. Sheep will keep all edible weeds in check, especially those persisting in growth after the feed in the pasture paddocks has dried off. At the same time the profits from sheep should be greater—not on account of the quantity of feed secured from the fallow, nor of any greater number being supported by that feed, but rather on account of the tonic effect of a little picking of green upon the general health of the flock when the bulk of pasture feed is dry. From a wool-growing point of view the beneficial effect would be discounted to some extent by the damaging effect of fallow dust upon the value of the wool, except in cases where rugging of sheep is practised.

It would appear that the cost of cereal growing may be reduced considerably by the elimination of two-thirds of the cultivation of fallow that would be necessary without sheep—that is, one-half of the number of workings on two-thirds of the usual area. (It must be noted that the cost of the original ploughing would not be materially affected, as the area not ploughed during "fallowing time" would have to be done before seeding.)

Further, it would appear that by following the suggested practice gross returns from cereal growing would be slightly reduced on the one-third of land not fallowed, against which an increased return from the greater number of sheep carried could be expected; and the combined returns from cereals and sheep should be greater; while the system of working would be considerably cheaper than that of fallowing without regard to sheep.

Handling of Horses.

[T. P. Bretag. Monarto South.]

The Young Horse.—When breaking in a young horse, it should be handled quietly. After the winkers have been put on the young horse should be taken out of the stable on a fair length of rope and allowed to run about for a while. It should be stopped a few times in order to stroke or pat the horse so as to let it know you are not intending to hurt it. By doing this you will find that the horse will calm down considerably and will soon know that it cannot bolt away into the field as before; it will know that it is mastered. Then a quiet and reliable horse should be put alongside the young one, both having good harness, with which it can be driven about, so as to learn to walk and guide in pair. Then a pair of chains and a swing should be hooked to the young horse with a log behind it, so as to make it pull a little. After this it can be put into a wagon and driven about. This also teaches the young horse to walk and pull with its mate. After an hour or two of this work the young horse will be much quieter. Probably half a day will have elapsed, and it is time that the horses be taken out of their harness. It is not advisable to work a young horse too much at the beginning; the horse will soon become tired and lazy, and will make a habit of this laziness if worked too long. It should be made to lead into the stable and given a little feed as well as the other horses. When chaff is fed, not too much should be given to the young horse at first, or it may cause colic when the horse is not used to chaff.

On the following day it should be taken out again, and if the horse is quiet enough, it can be put into a bigger team, always fitting the young horse alongside a quiet horse next to a nearsider if possible; if put in the middle of a big team you may have trouble when starting up your team, as the young one is bound to stand a little longer than the others, especially when getting a bit tired. This will drag your outside horses in together in a heap if you are not careful, which will make the young one go back instead of forward and get into the swings and chains, often starting a kicking contest, and arousing the whole team, which will take some quietening down. When working a young horse in a team with fairly heavy pulling, the best way is to have your two horse swings made of piping 1¾in. in size, with eyebolts at the ends, and a "U" clamp in the centre, on which you can loosen the nut and shift the clamp across, so as to give the young one a longer end to pull from. In this way the young horse will have a chance to get used to the work, and in most cases will keep up with your other horses at least half a day, which is quite long enough for a start. When driving a team (wagon, implement, or otherwise) the horses should never be allowed to start on their own account before the driver takes hold of the reins. This is a bad practice; they should always be made to stand until the driver starts them. In time this will also teach the young horse to stand, as horses are sometimes impatient on the way home, as when shutting a gate. When horses are properly taught to stand while one is doing anything, one will have less bolt-aways. If horses once bolt they are never to be trusted, and are inclined to do it again. My team will stand in the field yoked up to an implement for hours. When driving a team the driver should not shout to his team all day long. They will not take any notice after a while, as they get used to it. If the whip is used one will only make the fresh horses go along faster. Should there be a slow horse in the team and one wants to shift it along, the better way is to throw a few clods. This will not stir up the fresh horses, as a whip would. All harness should be well fitting, and a good watch should be kept for any blisters on shoulders. This can be done when unhooking chains at least once a day by lifting the collars. Every farmer should always keep some horse medicine on hand in case of sickness, such as sand trouble, when green grass is short.

Fallow Preparations.

[E. C. KELLER, Yandiah.]

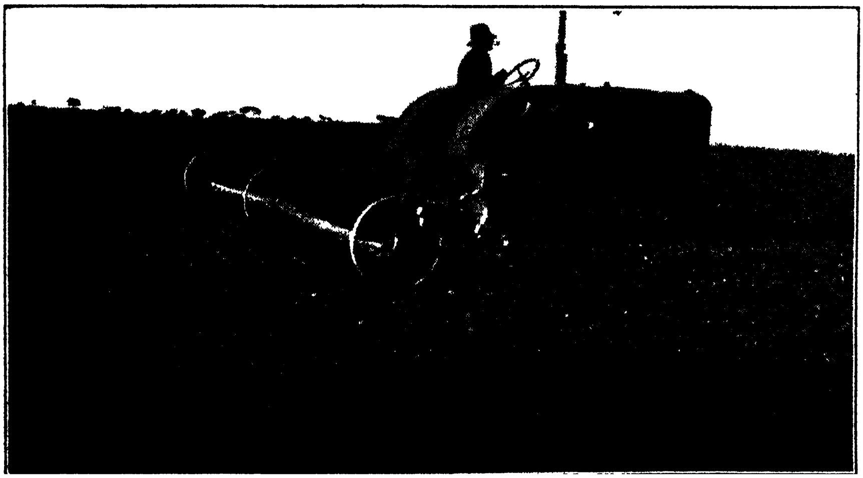
Fallowing can be done either with a plough or a good cultivator, depending upon conditions. No better method can be adopted for fallowing stubble ground which is still very loose as the result of lack of rain (as it has been in previous years) than working it with a cultivator, providing there is not too much weeds and grass.

When using a cultivator care should be taken to see that each tyne cuts its share and does not leave a ridged bottom. Once the tynes become worn they soon slip about and have a tendency to follow one another, especially where it is hard, thus leaving ridges.

When ploughing make sure that all furrows work at an even depth. If some furrows are deeper than others the land is left very uneven, and sometimes takes a long time to work back. Using long and short shares will also work up an uneven depth.

Fallowing should be done as early as possible so as to accumulate all the nitrogen possible. It has not been so noticeable in the last few years, but in some seasons the difference between early and late fallow shows very distinctly in the crop. If very much ground has to be fallowed, rather than do it late, it is preferable to summer fallow some of it. Fallow could be harrowed in August or September, using a set of heavy harrows.

The time of cultivating depends upon the weeds. A spring-tyne implement is preferable for cultivating, as far as working the fallow is concerned; and the spring-tyne will cope with weeds fairly well, too, provided the growth is not too strong. A cultivator with plate shares is better for cutting weeds, but does not open up the land enough. The share simply slips through without turning the soil. Especially where light working is required, such as after summer, the spring-tyne is best. The fallow should be left unstirred during the summer months, unless enough rain falls to necessitate working. Should any rain fall



after harvest the fallow could be harrowed again so as to break the clods and give a finer surface, thus encouraging weeds to germinate. If weeds make their appearance it will mean more cultivating, and this should not be left too late. The smaller weeds are the more easily destroyed. If possible this cultivation should be done while there is still moisture in the ground, and care should be taken not to work too deep at this period, or the result will be fallow without a solid bottom.

Preparation for Drought.

[E. R. SCHILLER, Sutherlands.]

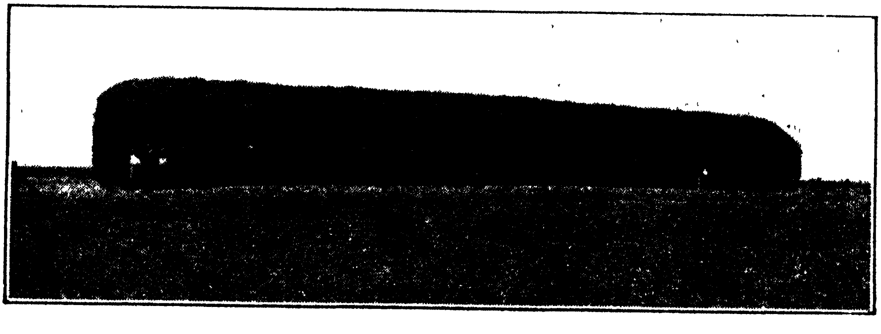
In this district it is essential for farmers to be prepared in the event of adverse seasons. Green fodders will be of little avail if the season be adverse. Side by side with the growing of these, it is essential to adopt an adequate system of conservation of fodder. Grain oats are normally the best and most economical fodder to store, but all animals require a bulk fodder to ensure that the intestines, and especially the bowels, function correctly. This is especially necessary in animals that chew the cud. By bulk one does not necessarily mean quantity, but rather fibre or roughage. Everybody who has had drought experience knows the ill-effect of concentrates alone, such as wheat. The chief danger lies in the fact that there is no bulk, but rather a nutritious mass. Grain oats, when compared with wheat, are rather poor in food value. Their real value is in the large percentage of horny husk to grain, as against any other form of concentrate.

Hay Stacks.—No means of conserving fodder is cheaper and more effective than the erection of extra hay stacks. It is a good practice for the farmer in normal seasons to erect stacks of reserve hay each year as a protection against drought. If the hay be well stacked and thatched, it forms an excellent stand-by. If this practice be followed for a few years, sufficient reserve will have been saved to carry through any likely drought. The farmer should aim at the conservation of large quantities of hay over and above what he will require for normal feeding.

Apart from the reserve of hay for drought, it is wise to keep hay not only to feed working horses, but also to feed cattle and sheep through some of the autumn months. Too many farmers over-estimate the carrying capacity of the ordinary farm, which in good seasons is quite high during six months of the year, and low during two or three months. We should make provision year by year for cheap but adequate feeding for this short period. By doing so we will be enabled to keep larger numbers of stock and keep them successfully. The erection of good green hay stacks is one of the most profitable methods of meeting this demand.

Straw Stacks.—The erection of straw stacks is also important. It is a good plan to erect at least one big stack every year that straw is available, but the straw must be stacked as soon as possible after the grain has been taken off, as the weather conditions soon destroy the little nourishment that straw contains.

Oat straw, as we know, contains the most nutriment, and it is a good plan in the parts of this district where oats can be successfully grown to cut the straw with a binder immediately after the oats have been stripped; straw thus stacked would be an



excellent standby in times of drought. It could then be chaffed with an admixture of a little hay, if hay were available, and fed to stock with the additoin of some concentrates. If loose straw stacks are fenced until they have settled down, the stock may later be given access to them. They will derive considerable feeding value by picking at the straw, especially during the winter months. They will also obtain excellent shelter from the weather. If the stacks are large enough, the cattle will not cause them to fall; the stacks will remain until an adverse season, when they can also be chaffed up with the hay and fed to the stock. After sufficient straw has been preserved for safety, a proportion can be chaffed each year and fed with corn to animals.

Cocky Chaff.—The conservation of the cocky chaff is another very important matter. After all available barns have been filled, it may be heaped up out in the paddocks in some convenient spot, and providing a layer of straw is placed on the bottom and a good covering of straw is placed over the top of the chaff, it will be preserved for many years, and will be a valuable fodder in an adverse season if fed to stock with the addition of grains such as oats.

One other method may be mentioned. An oat bin that will be a protection against mice should, if possible, be erected, and in this sufficient oats kept over in case of an adverse season. Oats rank as one of the best grains for horses. They combine all the elements necessary for nutrition in such proportions that the animal is able to consume a large amount without upsetting the digestion, and to extract the greatest possible amount of nourishment from them. Oats are rich in muscle-forming food, and possess moderate heating power. Oats can be broadcast in the paddocks for sheep in adverse seasons, if there is still rough picking. If no grass or other herbage is available, a small quantity of chaff should be fed.

If it is necessary to hand feed sheep, and self feeders are not available, suitable troughs for chaff can be made by opening bags and sewing them end to end. Allow about 1ft. to each sheep; fasten the bags to plain fencing wire, and fix the wires about 18in. from the ground with supports at fairly close intervals. Run another wire along the bottom of the troughing to keep it steady. Five hundred sheep will need 250ft. of troughing, allowing them to eat from both sides.

Naturally all these methods of conservation of fodder cannot be practised at once. They all cost money and labour. Moreover, as one form of provision is made, the other is less essential, but a farmer is courting trouble if he does not make provision in one form or another. The time of drought is a time of profit to a man who has made adequate provision.

Overstocking.—Emphasis has been laid upon the importance of maintaining large numbers of stock upon the farm, but overstocking is equally dangerous. Unless adequate provision can be made in both growing and conserving fodder, it is risky to attempt to maintain large numbers of stock. By adopting a reasonable system of fodder growing and conservation, a larger number of farm stock can be carried.

Activities of Women's Branches

BEETALOO VALLEY.

To mark the occasion of the conclusion of the first year's work of the Branch, a special meeting, attended by 16 members and a large number of visitors, was held in the local hall. Mrs. Orchard of the Belalie Branch extended congratulations to the local Branch. Mr. Pyne gave an address on a tour through Europe. Dancing and supper terminated a most successful and enjoyable evening. (Secretary, Mrs. Pearce.)

BELALIE.

The Vice-President, Mrs. S. Brook, 31 members, and 4 visitors were present at the August meeting. Mrs. Grogan gave an interesting address, "Mind over Matter."

At the meeting held on 1st September, Matron Twining of the Jamestown Hospital gave an instructive address, "The Value of the Hospital to the Country Town." Twenty-eight members and 6 visitors attended. (Secretary, Mrs. E. L. Orchard.)

BOOR'S PLAINS.

THE FLOWER GARDEN.

Mrs. G. Rodda presided over an attendance of 15 members. The following paper was contributed by Mrs. Ward:—Flowers and shrubs add to the attractiveness of a home, and give it a comfortable appearance. On a farm there is not time to specialise in gardening, so it must be considered solely as a hobby. This being so, it is of the utmost importance to plan the garden so that ultimately it will make as little work as possible.

The first thing to do is to provide suitable shelter, such as a stone wall or iron fence, but this will not be sufficient to cope with the strong winds that prevail at intervals. Bamboos grown inside the fence make a very good break. They grow to a great height, and are very little trouble after the first few months. A row of tall evergreen shrubs grown in front of the bamboos will provide still greater proof against winds. A hedge or row of shrubs is a neat finish to the front fence. If the garden is a big one, a lawn in the centre is suggested, with beds placed around according to one's own idea.

Remembering that the garden must be as little work as possible, make the paths wide and the beds small. Stones placed around the beds give a nice appearance. If the paths are cemented or rubbled, it means much less weeding.

Having decided upon beds and paths, the space left can be used for shrubs and rockeries. Shrubs are a very important factor in the garden, for they serve as a shelter, as well as a pleasing background to the flower beds. Rockeries have become very popular, and play a great part in beautifying the garden. Here can be planted Nasturtiums, Cinerarias, Anemones and Ranunculi in winter, and Petunias and Phlox in the summer; also small rockery plants obtainable from any nursery.

In preparing the beds dig out the soil to the depth of at least 8in., put in a layer of old stable or fowl manure, and fill up with a sandy loam. A good sprinkling of lime dug in will sweeten the soil, and help to rid it of pests. Regular attention to the surface of the soil with the hoe will kept it in good condition, and check the growth of weeds.

With a little forethought it is quite possible to have flowers all the year round. Any waste ground can be dug up and planted with Jonquils, Daffodils, and Freesias. It is not wise to put bulbs with other plants for if left in the ground they receive water when they should be resting, and this causes them to deteriorate.

Fences can be made beautiful with creepers. Roses, Geraniums, and Carnations are popular perennials. Some hardy winter flowers are Stocks, Snapdragons, Linarias, Larkspurs, Sweetpeas, and Iceland Poppies. Stocks and Snapdragons do not require manure. Sweetpeas and Iceland Poppies do well if weak liquid manure is applied once a week.

Hardy summer plants are Zinnias, Phlox, Petunias, Guinea-golds, Salvia, and Miniature Sunflowers. Zinnias and Phlox do much better if the seeds are sown straight into the flower beds, and thinned out later on. Keep summer flower beds covered with a thick coating of old manure. This keeps the surface soil cool and retains moisture. The seed beds should be kept continuously moist. For flowers and shrubs two good waterings a week are better than a daily surface watering. Plants will bloom for a longer period if flowers are picked off before going to seed. Ashes and soot sprinkled over the flower beds give the plants a healthy green appearance, and destroy pests.

When planting shrubs dig a hole 2ft. deep, and at least 1ft. square; fill this with water, and let it soak away. Throw some rotted manure in the bottom of the hole, and cover with sand to within 1ft. of the top. Loosen the roots of the shrub, and place it in the hole, then cover with the remaining soil to within 2in. or 3in. of the top. Water thoroughly. When planting young seedlings in summer, plant in the evening in a well watered bed, then shelter the young plants from the sun by sticking pieces of shrubs at intervals in the bed, making sure that every plant is shaded.

COONAWARRA.

With an attendance of 31 members and visitors, the annual meeting of the Branch was held on 26th August. Two new members were enrolled. The following officers were elected:—President, Mrs. H. Reschke; vice president, Mrs. E. Allder; secretary, Miss O. Lear; committee, Mrs. O. Skinner and Miss Clayfield. Reports of the past years' work were read by the president and secretary.

ECHUNGA.

Practical demonstrations of various household activities, as a general rule, convey more clearly to the audience which is privileged to see them the knowledge which the demonstrator wishes to impart much better than the reading of a paper. Members of the Echunga Branch held their September meeting at the residence of Mrs. P. Duffield, who gave a demonstration of Bacon Curing. The Secretary (Mrs. F. Dennis) reports that "all members are taking a keen interest in Bureau work, and that membership is increasing."

EURELIA.

Decorating a Hall.

Mrs. E. Hall presided at the meeting held on 26th August, which was attended by 10 members and 2 visitors. Mrs. E. P. Wall (Secretary) gave a demonstration of making artificial flowers, and then read the following paper:—In decorating a hall the amount to be spent in decorating must first be considered; a colour scheme and a design suitable for the occasion can then be thought out. Have all articles ready before commencing work; much time is lost in collecting hammers, tacks, and string; it usually takes much longer to decorate than is at first anticipated. When an overhead design is to be carried out an attractive centre piece hung from the middle of the hall is a good point to work from. Often the name of a society holding an entertainment will give an idea for carrying out a scheme. For sporting clubs who have their own particular colours, a design can be worked out in these shades. Flags and bunting are mostly used for decorating on patriotic occasions. A floral decoration is most effective; when the natural blossoms are hard to obtain paper ones can easily be made. Unless they are to be sold do not bother too much about detail, it is the masses of colour that count most.

GEORGETOWN.

On 25th August, the annual meeting of the Branch was held in the Memorial Hall, 19 members being present. The election of officers resulted as follows:—President, Mrs. G. Smallacombe; Vice-President, Mrs. J. Noonan; Secretary, Miss J. Crawford; Assistant Secretary, Mrs. G. Buckenara; Committee, Mesdames P. Smallacombe, J. A. Lyons, W. Sanders, and Miss M. Higgins. The Annual Report showed that 11 meetings had been held throughout the year with an average attendance of 14.

HOPE FOREST AND DINGABLEDINGA.

Eighteen members were present at the meeting held at Mrs. Jefferis' home on 3rd September, when Mrs. Florey gave a travel talk, "A Tour Through England." (Secretary, Miss M. De Caux.)

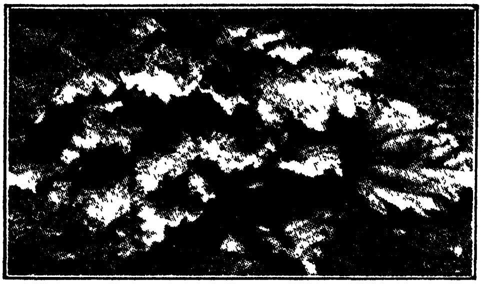
KYBYBOLITE.

Thirteen members were present at the meeting held on 4th August. Congress delegates were appointed. The meeting then took the form of a Question Box. *Question*: How to prevent a stove losing the polish quickly? *Anwer*: Mix the polish with methylated spirits or cold tea. *Question*: How to take an old ink stain off on oak table? *Answer*: Try sandpapering. *Question*: How to take grease out of a chair covered with shadow tissue? *Answer*: Use petrol, eucalyptus, or a good carpet cleaner. *Question*: What is the best way to treat a damp wall to prevent the damp coming through? *Answer*: Cover with tar paper and then paint or repaper. *Question*: How to prevent sponge sinking in centre? *Answer*: Cook a little longer. *Question*: How to keep the slides and inside of an enamel oven clean? *Answer*: Wash each day with warm water and soap. *Question*: Why a sponge sometimes goes damp in a tin (the cake was perfectly cool and the tin perfectly dry when the cake was put in)? *Answer*: The cake required a little longer cooking. (Secretary, Mrs. W. Kekwick.)

LAURA BAY.

RHUBARB.

The following paper was read by Mrs. J. Blumson:—Rhubarb is of high medicinal value, as well as a substitute for fruit for pies and preserves, and as it is easy of culture and a heavy bearer if liberally treated, should be grown in every home garden. It is a perennial plant, and if the ground is properly prepared and the roots well fed each year it will make very large clusters, and continue to yield for many years. It is better, however, to lift the plants every 3 or 4 years. Much larger and longer stems and better flavour are then obtained. As long as there is a good stout crown with a little piece of old root stem attached new roots soon form and start the crowns into activity. For soil select one that is deep, rich, of a light sandy nature, and well drained. Rhubarb can be raised from seed, but the seedlings take 2 years before they make any large leaves. Do not cut rhubarb leaves; pull out from the crown. For an ordinary-sized family, say, 6 persons, 12 rhubarb roots in three varieties maturing at different times will provide enough for all requirements.



MALTEE.

THE POTATO.

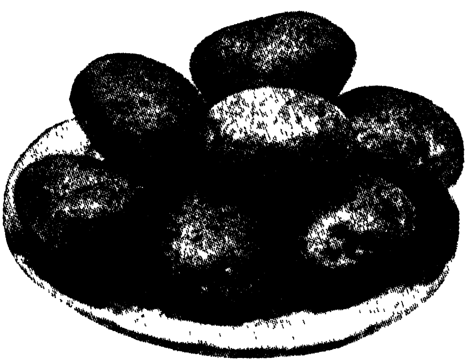
At the meeting held on August 27th the following paper was read by Miss T. Schwarz:—

The potato is a vegetable that is chiefly grown in a cool, wet climate. They are used extensively in homes as a main vegetable (in some countries they are used twice a day as the chief food). All potatoes should be washed well before being used. A good way is to scrub them with a small stiff brush. Most potatoes should be cooked with their skins on, especially the new potato, as most of the goodness, or the best food elements lie just below the skin.

There are quite a number of ways in which to prepare them for the table. Boiled and mashed potatoes are the most common ways of preparing them, but are the least nourishing, as the greater part of the goodness is in the water. The water, however, need not be thrown away, as it makes a good foundation for soups and stews, and also may be used for yeast. It is a good plan when roasting meat to put a few small potatoes or larger ones cut in halves in the baking dish also, but leave the peel on as they are much nicer.

Baked potatoes are very good if cooked in this way. Wash and scrub until thoroughly clean, then dry with a cloth and rub over with olive oil (as this gives the skin quite a nutty flavour), or butter may be used instead. Put into a paper bag and bake in a fairly hot oven for a good hour. Test with a fork or knife, and if soft, place on plates, then cut in halves and add a little butter on top. This method saves washing up.

When potatoes are old, the skin becomes tough and it is better to peel them. Here is a good way to prepare them:—Rub the bottom of the saucepan with butter and then cut up the potatoes and add enough milk, but not to cover them, and let them steam gently until soft, then add a little butter and mix well.



If potatoes are to be fried they are much improved if soaked in salted water for some time. This removes some of the surface starch and makes them much crisper when cooked. Use boiling fat, otherwise they become sodden and pale.

Potato Pyramids.—Mash 6 cooked potatoes with sufficient milk so that the potato may be formed into small pyramids, and arrange these in a shallow baking dish. Score the outside of the cones and sprinkle with grated cheese. Pour some melted butter over them and place in a slow oven until quite hot.

Baked Potatoes on Half Shell.—Bake potatoes; when done cut in halves, scrape out the contents into a hot bowl and mash. To every 6 potatoes add 2 tablesps. butter, 3 tablesps. hot milk, ½ tablesp. salt. Mix thoroughly, beating with a fork or egg beater, then add the beaten whites of 2 eggs, do not stir, but beat. Refill the skins very lightly, heaping high on top and keeping the surface rugged. Place into a shallow pan and bake until well browned. Garnish with parsley and serve hot.

Potato Croquettes.—Two cups mashed potatoes, 1 tablesp. chopped parsley, yolks of 2 eggs, 1 teasp. chopped onion. Mix all ingredients together and form into cylinders, dip into beaten eggs, then in breadcrumbs. Fry in very hot fat.

Stuffed Creamed Potatoes.—Select potatoes as nearly the same size and shape as possible, hot peas, a little butter, pepper, salt, cream and parsley. Hollow potatoes out to form little oval cases, then boil in salt water until tender. Drain. Take some peas which have been cooked and have had melted butter over them, and while still hot, fill in the hollows of potatoes. Season some cream with pepper and salt and thicken slightly. Pour a tablesp. of this over each potato. Serve very hot and garnish with parsley.

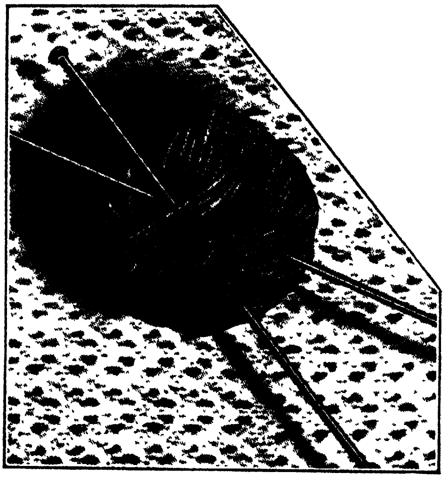
Potato Pancakes or Mock Fish.—1½ cups grated potatoes, 1 tablesp. sour cream, 1 tablesp. grated onion, salt, pepper, 1 tablesp. flour, 2 eggs. Mix thoroughly and fry in hot fat. Although the potato is a vegetable, and all vegetables are very healthy, it is the least nutritious of all.

McLAREN FLAT.

The meeting held on 27th August was attended by 18 members, and took the form of a Knitting Afternoon. Mrs. B. Elliott read the following paper on "Knitting":—

"When buying wool be sure to get enough to finish the article; most shops allow the return of unused skeins. It is best to get a medium quality wool. Very cheap wools are coarse and hairy; very soft expensive wools are not suitable for hard wear, and are more liable to shrink. For baby's clothes or singlets use very soft wool, knitted on big needels. Buy needles of a correct size to suit the wool, and do not have them too sharp. It is a good plan to have them of a different colour than the wool. Short needles are better than long ones, and fine needles need to be steel-lined, or they will bend.

Wool should never be wound into a hard ball. This stretches it and makes it thin and poor. Wind loosely over three fingers, and the wool retains its softness.



In commencing the first row always knit into the back of the stitches, and a firm edge will result. When starting with a ribbing of purl and plain knit into back of plain stitch and purl the next; repeat to end of row. This way does not leave a ridge. When starting a row always slip the first stitch. Slip a plain stitch as if to purl, and a purl stitch as if to knit. This gives a nice edge for sewing together. Do not leave work in the middle of a row, or poke the needles through the kitting; this makes holes.

To join wool neatly, darn one end into the other. Do not join in the middle of a row. The join is less conspicuous near the edge of the work, or wool can be knotted at the outside edge and afterwards untied and darned in. Cast off stitches on wrong side of work. There are only two stitches in knitting—plain and purl. It is the way they are placed that makes the pattern. Men's socks wear well if knitted on small needles with good wool. If the hands are rough from gardening wear a pair of silk gloves to prevent the wool getting roughened and fluffy. A broken needle sharpened to a point makes a handy short needle to use as a spare one in doing cable pattern.

Hints for Washing Woollens.—Woollen garments should never be rubbed with soap, but gently moved about in warm (not hot) water, in which good, plain soap has been dissolved. Rinse in clean warm water of the same temperature, and dry quickly without wringing. Do not allow woollens to lie damp; that induces shrinking, and may cause the colours to run. Small knitteds keep their shape better if tacked to a piece of calico before being washed. Press with a damp cloth, and hold it down for a second or two until the whole surface is covered. Never press ribbing, and fancy knitting only on a thick towel lightly."

Mrs. Elliott also demonstrated with a home-made wool-winder, and showed knitting on a circular needle and a jumper knitted in this way. Several members showed knitted articles, dressing jackets, jumpers, and a pair of thick socks for wearing with rubber knee-boots caused interest among members. Socks, baby clothes, gloves, knitted toys, and a sample of double knitting, also grafting of a sock toe, was shown by the Secretary (Miss F. Bell).

MILLICENT.

CITRUS RECIPES.

Thirteen members were present at the August meeting. The following recipes were given:—

Mock Ginger, Mrs. Bryant.—Pour ½gall. of water over ½lb. new lime, let stand 12 hours. Cut up 9lbs. of melon into 1in. squares, pour the clean lime water over melon and let stand all night. Drain in the morning and put in pan with 1qt. of water, 6lbs. sugar, ½oz. tartaric acid, ¼lb. whole ginger tied in a muslin bag, boil gently 6 hours. Bring syrup to the boil before adding melon.

Orange Marmalade, Mrs. Kemp.—Twelve navel oranges and 2 lemons cut in small pieces, the smaller the better. Cover with 3qts. of water and let stand 24 hours. Then measure the juice and allow 1lb. of sugar to 1qt. of juice, and boil until tender or transparent.

Marmalade (1) **Mrs. E. W. Willshire.**—Quarter and cut into thin slices, 6 Seville oranges and 6 lemons, removing pips. Pour over them 5qts. water and let stand all night. Boil briskly 1 hour, then add 12lbs. sugar and boil another hour until it jells.

Marmarlade.—Cut 18lbs. Poor Mans oranges into quarters and remove seeds. Slice fruit and skin very finely. To every pound of fruit and 1qt. water. Let stand 24 hours, then boil 25 minutes. Take off and let stand for 24 hours more. Weigh and put 1¼lbs. sugar to every pound of fruit and juice, bring to boil before adding sugar. When fruit is on fire, add 6 lemons cut in halves. Boil all for ½ hour, skim and stir constantly. Before bottling, remove lemons.

Mrs. Redman.—Grapefruit and cheese and dates is a combination well worth trying. To 2 cups of grapefruit pulp allow ¾ cup each of dates and creamed cheese and ½ cup roughly chopped nuts. Mix the grapefruit and dates, blending them in French dressing. Fill curved lettuce leaves with the mixture and put a spoonful of creamed cheese in the centre. Sprinkle the cheese with chopped nuts. Grated cheese mixed with whipped cream may be used in place of creamed cheese..

Grapefruit Jelly Salad.—One-third cup of sugar, 2 tablespoons of water, ¾ cup of grapefruit juice, 1 tablespoon of lemon juice, pinch of salt, 1½ tablespoons of granulated gelatine which has been soaked in ⅓ cup water. Boil the sugar with 2 tablespoons water for 3 minutes. Add gelatine and stir until cold, then add fruit juices and a pinch of salt. Strain into small moulds and leave until set. Mix some cream cheese with a few drops of onion juice and a little thick cream. Season with salt and pepper. Turn out the jelly and pipe the cheese mixture round each mould. Garnish with watercress, if available or with small letture leaves. Serve with French dressing.

When baking grapefruit marmalade, those who do not like the pronounced bitter flavour might try cutting off the yellow part of the rind, and shredding it finely and using this with the pulp, rejecting the white part of the skin. Marmalade thus made is very clear, pale gold in colour and of a delicious flavour.

MORCHARD.

Mrs. C. Schulz presided over an attendance of 10 members and visitors at the meeting held on 26th August. Mrs. C. Schulz gave a demonstration of re-footing stockings and socks, and the Secretary (Miss F. Brown) gave recipes for Pickles, Sauces, and Chutneys.

PENOLA.

At the meeting held on 2nd September, Mr. E. P. Walsh, an officer on the staff of the South Australian Railways, gave a practical demonstration of First Aid to the Injured. Twenty-five members and visitors attended. (Secretary, Mrs. E. Kidman.)

PINNAROO.

SALADS.

At the meeting held on 4th September, the following paper was read by Miss N. Mattiske:—

A happy solution to the problem of hot weather meals are cool, crisp salads, which have a definite food value, and a valuable supply of mineral salts and vitamins. The vegetables (raw for preference) should be fresh and young, also well washed and dried before using. For best results, cut salad vegetables before the heat of the day, and keep in cold water, or some cool place, until the time of preparing for the table. If the dressing is not served separately, it should not be poured over the salad until just before serving. Always make the vegetable look attractive when cutting up. It will gain much more favour, and be more tempting.

RECIPES.

Stuffed Tomato Salad.—Take firm round tomatoes, scoop out some of the pulp, fill with diced celery, cucumber and onion with mayonnaise. Serve on lettuce leaf.

Rose Salad.—Choose firm cold tomatoes, wash and dry them. Cut down from the stem end into eighths without cutting through the base. Press the sections out to resemble the petals of a flower. Place on crisp lettuce leaves, or beds of shredded lettuce. Add a little salt and cayenne to some grated cheese and moisten with a little boiled dressing. Place a tablespoon in the centre of each tomato. Pour over some dressing and serve at once.

Potato and Tomato Salad.—Slice cold boiled potatoes and tomatoes and place in layers in a glass dish. Season with salt and pepper and pour a good salad dressing over it.

Potato Salad (*No.* 1).—Cold boiled potatoes, hard boiled egg, grated onion, chopped parsley, a little celery. Slice potatoes and egg, and arrange ingredients in bowl in layers. Pour over mayonnaise.

Potato Salad (*No.* 2).—Cold potatoes, cooked beetroot, chopped parsley, salad dressing, and a litttle minced onion. Cut potatoes and beet in slices. Put a layer of potatoes in a salad bowl, sprinkle with chopped parsley and onion. Then put a layer of sliced beetroot, then a layer of potato, parsley, and onion alternately. Pour salad dressing over and garnish with hard-boiled egg.

Apple and Mint Salad.—1½ cups diced apple, 1½ cups diced celery, 1½ teasps. chopped mint, ¼ teasp. salt, lettuce, salad dressing. Mix apples and celery with salt and a little dressing. Arrange on crisp lettuce leaves, sprinkle with chopped mint, and serve with extra dressing.

Italian Salad.—Take 1 cup each of diced cooked turnip, carrot, potato, and beetroot, a little chopped onion and mix together with boiled or mayonnaise dressing to which a little tomato ketchup has been added. Pile in a salad dish, sprinkle with chopped capers and garnish with cress or parsley.

Asparagus Salad.—1½ cups diced cooked chicken, 1½ cups diced asparagus tips, 2 cups of chicken stock, 1 teasp. salt, 2 tablesps. gelatine, ½ cup cold water, ¼ cup sugar, juice of 2 lemons. Heat the stock to boiling point, dissolve sugar and salt in it, and pour over gelatine that has been softened with water. Add lemon juice and strain into a bowl. Chill until it begins to set, then mix in dried chicken and asparagus tips. Pour into individual moulds, and serve when set with lettuces and radishes.

Water Lily Salad—1 hard boiled egg for each person, mustard and cress cucumber. Make a bed of mustard and cress on each plate, or where these are not available, use shredded lettuce. Remove shells from eggs with a knife. Cut the whites away from the yolks, cutting from the top to the bottom, not round. Cut each yolk in halves and place ½ yolk in centre of each bed. With a sharp knife cut the whites into strips (rounding off the tops a little) to represent water lily petals. Arrange round the yolks. Place thin slices of cucumber around the lilies to represent leaves. Rub remainder of egg yolks through a sieve and arrange round the outside in small heaps. Pour dressing over and serve at once.

Boiled Salad Dressing.—6 tablesps. sugar, 4 dessertsps. flour, 2 teasps. salt, 4 teasps. mustard, 4 tablesps. butter, 2 cups vinegar. Put dry ingredients into a saucepan and mix to a smooth paste with some of the vinegar, use a wooden spoon for mixing. Add gradually the rest of the vinegar and the butter. Stir over a low flame until it boils, and boil 3 minutes. Bottle and cork securely. This dressing keeps well. Thin down with milk when required.

American Dressing.—Yolks of 3 eggs, 1 cup cream or milk, ½ cup vinegar, 1 teasp. mustard, 2 teasps. salt, a good pinch of cayenne, 2 tablesps. melted butter, 2 tablesps sugar. Beat together eggs, sugar, and seasoning, cream or milk, the butter, and then very gradually the vinegar. Cook in a double boiler until it begins to thicken. Beat the egg whites stiffly and add when the dressing is cool. (Secretary, Miss M. Wirth.)

PINBONG.

Before an audience of 13 members and visitors Mrs. C. H. Scholz gave a demonstration of Pastry Making at the meeting held on 29th August. A picnic will be held by the Branch early in October, and members decided to donate a trophy for the Wudinna Show. (Secretary, Miss D. Scholz.)

SHEOAK LOG.

Mrs. Bowden occupied the chair at the meeting held on 2nd September, which was attended by 30 members. The meeting took the form of a Question Box. *Question*: How to destroy the strong flavour in butter caused by using cream with weed taints? *Answer*: Put a little saltpetre in the milk. *Question*: What is the best method of cleaning feathers? *Answer*: Put in a bag, boil, and hang in the sun to dry. *Question*: What to do with fowls eating eggs? *Answer*: Give the fowls meatmeal or shell-grit. *Question*: What is the best polish to hide scratches on furniture? *Answer*: Olive oil and vinegar, turpentine, linseed oil, and kerosene in equal parts. Liquid veneer and Johnson's floor polish. *Question*: What will prevent chocolate icing from fading? *Answer*: Use butter and boiling water to mix. *Question*: How to take mildew from white linen? *Answer*: Use glycerine. Miss Helen Koch then read a paper written by Mrs. Allder, of Coonawarra, on "The Use of Dried Fruits." Miss Phoebe Tremlett read Miss Campbell's booklet entitled "The Use of Hessian in the Home." A Canadian booklet on eggs was read by Miss Mattiske. Community singing and tea brought the afternoon to a close.

SNOWTOWN.

The meeting of 13th August was held in the Institute, with an attendance of 16 members and 4 visitors, and took the form of a "Lend a Hand Afternoon." Mrs. T. Jenkins has recently been appointed Secretary.

WARCOWIE.

About 15 miles north of Hawker is situated the small township of Warcowie, at which centre is the farthest north Branch of the Agricultural Bureau. Although only a very small community, the womenfolk of this district form a most active unit of the Women's Branches. The Branch held its Annual Meeting on 1st September at which the following officers were elected:—President, Mrs. N. Crossman; Vice-president, Mrs. R. Jarvis; Secretary, Mrs. Avery. Out of a total membership of 8 members, the average attendance over the past 12 months has been 5. Early in the new year the Branch will endeavour to hold an exhibition. Mrs. Burns, of the Morchard Branch, very thoughtfully forwarded a paper, "Making Artificial Floral Decorations."

WASLEYS.

The Annual Meeting was held on 27th August, there being present 17 members visitors. The election of officers resulted as follows:—President, Mrs. A. Wilson; Vice-President, Mrs. E. Day; Secretary, Miss K. Harding; Members of Committee, Mesdames F. Sanders and E. George. Trophies won in the recent Cake Competition were presented to Mesdames J. Hancock and A. Wilson.

WEPOWIE.

The August meeting was held at the residence of Mrs. Noske, there being present 9 members and several visitors. Mrs. L. Jasper read a paper "Sauces and Pickles." (Secretary, Miss E. Roocke.)

JOURNAL
OF THE
Department of Agriculture
OF
South Australia

VOL. XL. NOVEMBER, 1936 No. 4

Published Monthly by the Department of Agriculture Edited by H. C PRITCHARD

	Page
Activities at Roseworthy Agricultural College, 1935-36	309-317
Export Lambs	318-321
Subterranean Clover—Its History in South Australia	322-330
Apple Scab	331-333
Changes in the Staff of Department of Agriculture	334
Statistics	335-336
Chick "Sexing"	336-337
Agricultural Bureau of South Australia—Conferences	338-339
Feeding Tests at Parafield Poultry Station	340
Egg-Laying Competitions	340-342
Advisory Board	342-345
Papers Read at Conferences	346-368
Rainfall Table	369-370
Bureau Reports	371-383

WOMEN'S BRANCHES.

Bureau Reports	383-390

All communications to be addressed:
"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1937

River Murray (Swamps), at Wood's Point, Thursday, 18th February (Mr. F. P. Baily).

Lower North, at Wasleys, Thursday, 25th February (Mr. Elliot Day).

Mid-North, at Koolunga, Thursday, 11th March (Mr. J. W. Sykes, Koolunga).

Yorke Peninsula, at Stansbury, Wednesday, 24th March (Mr. H. W. Cornish).

Dairying, at Lobethal, Thursday, 13th May (Mr. B. Schapel).

River Murray, at Waikerie, Thursday, 17th June (Mr. F. B. Harden).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Turretfield Seed Wheat Farm

Varieties for Sale, 1936-37 Season—

Ranee 4H.
Ford.
Nabawa.
Sword.
Federation.
Sultan.
Dundee.

Price (on truck, Sandy Creek or Roseworthy) will be 6d. per bushel above Port Adelaide price on the first day of the month in which the order is placed. An allowance of 2d. per bushel will be made to buyers who take delivery at the farm.

Orders should be addressed to "The Manager, Turretfield Seed Wheat Farm, Rosedale."

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Activities at Roseworthy Agricultural College, 1935-36

Part V.—Livestock. By A. R. Callaghan, D.Phil., B.Sc. (Oxon.), B.Sc.Agr. (Syd.), Principal.

Work with livestock is chiefly of a routine nature, and fresh information of detailed character is only spasmodically available. A certain amount of experimental work is always being conducted, especially with sheep and pigs. For the most part, such work involves considerable time and only calls for report at the conclusion of the experiments. The general progress made each year in livestock improvement is naturally slow and difficult to assess, only in a few instances is special headway apparent. The consequence is that any annual statement on livestock at the College, must either be an irksome repetition of previous statements, or, alternatively, an outline of the more interesting phases of the work. I choose the latter course, for although conscious of the incompleteness of such a statement, data of interest can be recorded, and certain aspects of husbandry cited, which may prove helpful to many who may be facing similar problems.

The Horses.

In 1933, the College imported from New Zealand a Clydesdale colt, Cyrus (2455 N.Z.C.S.B.). The first drop of foals by this horse in the season 1934-5 totalled 13, and they were particularly even in colour and general characters, all being attractive clean-boned animals. This was very heartening, especially in view of the fact that of the 13 foals reared only one (a colt) was eligible for full registration in the Stud Book, two were eligible for Appendix B, and one eligible for Appendix A. Such uniformity from ordinary mares indicated a prepotency of the sire very much above average.

Last season, that is 1935-6, 14 foals were reared, all sired by Cyrus. These, too, were of the same general type and character, and of similar quality to those of the previous season. Of these, two fillies and one colt were eligible for full registration, and three were eligible for Appendix B of the Stud Book. Incidentally, it might be added that the College has never previously raised as many as 14 foals in one season, nor as many as 27 in any two previous years, which was the number reared in the last two seasons.

There has been no livestock feature attract more attention of visitors during the season than these young horses, all the progeny of Cyrus, and without exception they have been regarded as a particularly good advertisement for the horse and his prepotency An explanation of this extremely high level of dominance on the Sire's side is in his breeding, for Cyrus was sired by Bonny Dene out of a mare Frills; this mare was also sired by Bonny Dene. Successful inbreeding of this nature guarantees a certain purity of characters which, in turn, is the basis of prepotency.

The College Clydesdale Stallion Cyrus under the critical eyes of visiting farmers.

Last year, a resumé of certain feeding tests with mares and foals was outlined in this portion of the College report. Similar rations, based on feed supplies available on the farm, were fed with equally good results last season. The ration fed mares-with-foals was based on a daily feed for a mare and four months old foal weighing, together, approximately 2,100lbs. and consisted of 35lbs. Wheaten chaff, 20lbs. Green Lucerne, 4lbs. Pease, 2lbs. Wheat, 2lbs. Barley (all grain mixed and crushed), and ½lb. Linseed Meal. This ration could, undoubtedly, be improved upon with oats in lieu of some of the other concentrates, but as oats are in great demand for pure seed purposes, sufficient is seldom available for general feed on the College Farm. The ration, as stated, has a nutritive ratio of 1:7.5 and conforms with the recognised requirements for a mare suckling foal. Where oats are available the ration might be modified to 35lbs. Wheaten Chaff, 20lbs. Green Lucerne, 5lbs. Oats, 2lbs. Bran, and ½lb. Linseed Meal.

To vary the approach for students, it was decided to put the yearling horses on a ration, again based on available feed supplies, and, on the basis of an average liveweight of 900-1,000lbs., the following daily ration was allotted each of 12 fairly evenly grown yearlings:—

15lbs. Mixed Wheaten and Oaten Chaff
5lbs. Green Lucerne
1lb. Peas, Mixed and Crushed
½lb. Wheat, Mixed and Crushed
½lb. Barley, Mixed and Crushed
¼lb. Boiled Linseed

Fed in three feeds daily.

Fourteen foals, all the progeny of Cyrus, were reared in 1935, and like the 13 of the 1934 season, they constitute a particularly even lot. All the foals are handled from birth, and their tractability soon becomes a leading characteristic.

The animals were brought in from ordinary paddock grazing and weighed on the 12th December, 1935. Up till this time, paddock feed had been good, but more extensive supplementary feeding was necessary, and an early start was made to avoid loss of condition. Feeding on the ration set out above commenced immediately and the horses were given free range in a small paddock of average wheat stubble. Each yearling was subsequently weighed at fortnightly intervals, and over the first six weeks an average daily increase per head of 2.31lbs. was recorded. One interesting feature of these first three weighings was that the second weighing on the 14th January, following rain and several quite cold unseasonable days, disclosed only slight increases compared with the previous and subsequent fortnightly increases. By 31st January, the growth rate was fully restored. This minor fluctuation in rate of increase, due to the cold change, indicated that the ration, although very satisfactory during warm weather, would need to be increased for winter feeding.

The yearlings continued to make good progress, but it became evident in February that the ration should be adjusted to meet the additional requirements due to growth, and to meet the lesser quantity of paddock feed. Accordingly the ration was increased by the addition of 6lbs. of wheaten hay, 2lbs. of mixed wheaten and oaten chaff, and 5lbs. lucerne.

The following are the individual weights of the yearlings at the commencement of ration feeding on the 12th December, 1935, and at the termination of ration feeding on the 4th May, 1936.

GROWTH OF YEARLING HORSES OVER A PERIOD OF 143 DAYS, ROSEWORTHY AGRICULTURAL COLLEGE, 1935-36.

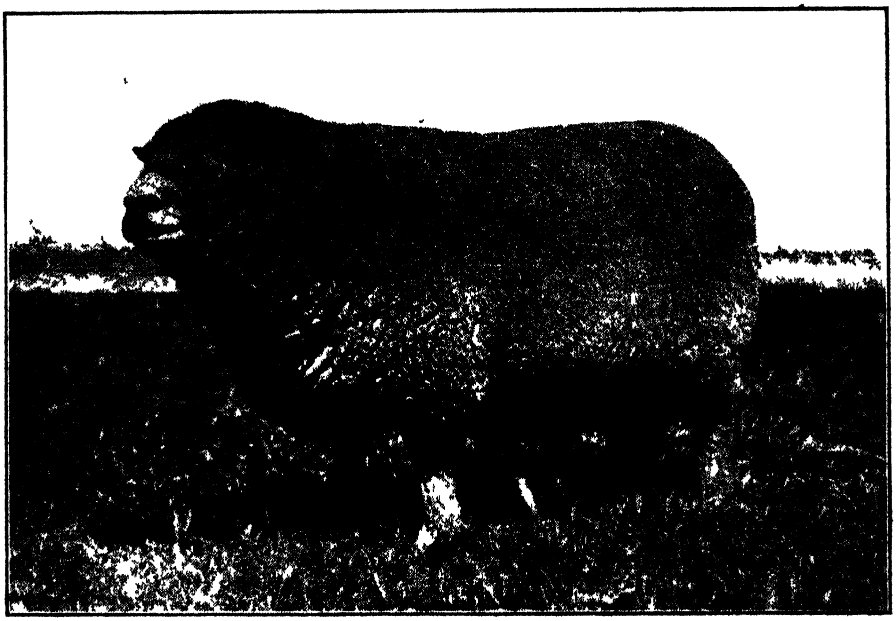
Name.	Weight on 12/12/35. Lbs	Weight on 4/5/36 Lbs.	Increased Weight in 143 days. Lbs.
Flower	1,010	1,260	250
Nell	1,000	1,325	325
Lady	930	1,160	230
Letty	960	1,220	260
Bonny	760	1,000	240
Monarch	1,020	1,260	240
Noble	1,030	1,305	275
Duke . . .	960	1,220	260
Ruler	930	1,150	220
Victor	920	1,280	360
Count	780	1,080	300
Regal	1,000	1,190	190
Averages	941 6	1,204.1	262 5

Average daily increase per head for 143 days, 1.84lbs

Sheep.

College interest in sheep centres chiefly round commercial fat lamb production and a Southdown stud. During the last two years the latter received outstanding benefit from the ram Matatua U96, imported from New Zealand in 1933.

At the Royal Adelaide Show in 1935, first prize was obtained for both the ewe and ram classes under 1½ years old, and second prize for shorn ewe of the same age, all three sheep being sired by Matatua U96. The championship for the Southdown ewe was again annexed, but by a different ewe from the 1934 champion, and in addition two first prizes, four seconds and one fourth prize were won by the Southdowns at the 1935 Show. At the Southern Stockowners' Sheep Show at Mount Barker, Matatua U96 won the Southdown



Matatua U96, Champion of Champions Shortwool Ram (Southern Stockowners' Society Sheep Show, 1935).

ram Championship and was later awarded the Championship of the Short Wool Breeds of the Show. At the same Show, the Reserve Championship was won and two other sheep were awarded second prizes.

Substantial progress has been made in the ewe hoggets which are being raised in the half-bred ewe breeding experiments, and all have grown into good, roomy large-framed sheep. This work was begun in 1934 when various breeders loaned or gave Corriedale, Romney Marsh, Dorset Horn and Border Leicester rams for mating to Merino ewes. The wether lambs were disposed over as fat lambs on reaching an average live weight of 72lbs., some being sold through the Abattoirs, and some being exported direct.

Four Champions from the College Southdown Stud Champion of Champions Shortwool Ram (Southern Stockowners' Society Sheep Show, 1935), Champion Southdown Ewe (Royal Adelaide Show, 1934), Champion Southdown Ewe (Royal Adelaide Show 1935), and the Reserve Champion Ewe (Southern Stockowners' Society Sheep Show, 1935)

HALF BRED EWE BREEDING EXPERIMENT.—LOCAL MARKET PRICES AND SKIN VALUES FROM WETHER LAMBS, EXPORTED, ROSEWORTHY COLLEGE, 1935

Cross	Live Weight at College. Lbs	Days to Mature.	Average Price at Abattoirs. s. d.	Skin Value from Lambs Exported. s. d.
Dorset Horn x Merino	72	93	17 4	2 8
Romney Marsh x Merino	72	105	16 10	3 4
Corriedale x Merino	72	107	16 1	3 3
Border Leicester x Merino ..	72	107	15 7	3 8

The ewe lambs remaining were shorn in September, the individual fleece weights recorded and the wool classed into first and second grades, the first grade lambs' wool brought 7½d. per lb. and the second grade 5d. per lb. The following table gives relevant data which, although not analysed or complete, will be interesting to those following this particular experiment.

HALF-BRED EWE BREEDING EXPERIMENT.—WOOL WEIGHTS AND PRICES FROM EWE LAMBS, ROSEWORTHY COLLEGE, 1935.

Cross.	Average Weight of Wool—		Total.
	First Grade. (7½d. per lb.)	Second Grade. (5d. per lb.)	
Corriedale x Merino	2.515	2.364	4.88
Romney Marsh x Merino	3.421	1.947	5.37
Dorset Horn x Merino	2.087	1.957	4.04
Border Leicester x Merino	3.062	1.656	4.72

The ewe progeny of these crosses, as well as a line of pure Merino ewes, will be mated this year to Southdown rams, and both wool and lamb values will be followed in detail. The matter published herein is merely of an interim nature to indicate what progress has been made.

Sire and Prize Winning Progeny, Adelaide Royal Show, 1935. Sire:—Second Prize Ram over 2½ years Progeny:—First Prize Ram under 1½ years; First Prize Ewe under 1½ years; and Second Prize Shorn Ewe under 1½ years.

A matter of particular interest at the moment is the rugging of sheep. In 1934, the College rugged a few sheep and results were sufficiently encouraging to begin an experiment in a big way to assess the practicability of rugging and its economic possibilities. After shearing and dipping in September and October (1935), respectively, 300 of the College ewes were rugged. For every sheep rugged, one was left unrugged, in each of the College ewe flocks including Border-Leicester-Merino half-breds and Merinos. In this way 50 per cent. of the sheep in every flock were rugged, each flock maintaining its identity, so that those rugged received identical treatment in every way with those not rugged. Observations made, so far, substantiate the effectiveness of rugging on the growth and value of the wool, but in spite of the fact that good quality rugs were used, indications are that few of them will be intact on the sheep at shearing time, and certainly a very small number will be of any further use. An effective, adjustable, good wearing, economical rug is the most essential consideration.

The wool of each rugged sheep, as well as each sheep not rugged, will be weighed separately and the two groups of wool kept apart for marketing at the same sale. The results from this trial should be sufficiently definite to indicate whether or not rugging is an economical and practicable proposition, under conditions similar to those pertaining at the College.

Dairy Cattle.

In the Jersey herd, 27 cows were under official test, 15 of which were in the aged class, seven in the three and four year old classes and five in the two year old classes. Two of the junior two year old heifers (standard 230lbs. butterfat), Roseworthy Sunbeam II. and Roseworthy Bramble, both passed the 300lb. butterfat mark, with 318.61lbs. and 303.40lbs. respectively. Roseworthy Rose, a senior three year old, with a standard of 290lbs, produced 406.79lbs. of butterfat in the 273 days. The following are the results from eight cows, all of which exceeded 400lbs. of butterfat in the 273 days:—

Cows Testing Over 400lbs. Butterfat in 273 Days, 1935-36.

	Milk in Lbs.	Average Test. (Percentage.)	Butterfat.	Standard.
Roseworthy Erudite II. ..	8,421½	5.76	485.11	350
Roseworthy Glimmer	7,352	6.10	448.70	350
Roseworthy Flora	7,239	5.93	429.29	350
Roseworthy Fay . ..	7,738½	5.52	427.17	350
Roseworthy Princess 41 ..	7,594½	5.40	420.99	350
Roseworthy Rose	7,341	5.54	406.79	290
Roseworthy Princess 21 ..	7,399	5.48	405.82	350
Roseworthy Sunbeam	8,427	4.79	403.75	350

During the year, four cows were purchased from Mr. James McEwin; of these, three were placed under official test on arrival at the College, after being conceded an allowance based on averages for the first 90 days. Glen Ewin's Morns Mayflower, and Glen Ewin's Molly Mytilda completed their tests during June, 1936, and their records were, respectively, 5,016lbs. milk, average test 6.56 per cent., 329.21lbs. butterfat (standard 290lbs.), and 4,479lbs. milk, 5.95 per cent. average test, 266.45lbs. butterfat (standard 230lbs.). The final figures from Glen Ewin's Sweet Rose were 6,519lbs. milk, average test 5.59 per cent., butterfat 364.86lbs. (standard 230lbs.). The other cow purchased, Crofton Morning Star, was not under test.

A notable purchase was that of the young bull Lanacoona Brown Laddie from Mr. Vereo This bull was sired by Lanacoona Pelledes out of Lanacoona Brown May, a daughter of the famous cow Melvin Duchess. The dam, Lanacoona Brown May, produced 430.08lbs. of butterfat in 273 days as a junior two year old, while the grand-dam, Melvin Duchess, has won Championship honours at Adelaide in 1932, 1933, 1934 and 1936, and holds the State Jersey breed records, (*a*) as junior three year old with 554.9lbs. butterfat (1932), (*b*) as senior four year old with 644lbs. butterfat (1933), and (*c*) as mature cow with 755.56lbs. butterfat (1936).

The Crossbred as an Export Pig.

The College is testing out a number of different crosses with pigs, with the object of testing their suitability for the overseas market. This work obviously is slow, as the number of possible crosses is high, and resources limited. However, some progress has been made with these cross-breeding experiments and, from the results to date, some very interesting and useful data are available. When the work is completed a comprehensive report will be published separately.

Carcasses of the following crossbreds have been sent overseas, and thanks to the ready and able co-operation of the South Australian Agent-General and

Trades Commissioner, Mr. C. F. G. McCann, expert criticism of these has been received:—

No. 1. Large White x Tamworth x Berkshire (old type).
No. 2. Large White x Berkshire (old type).
No. 3. Tamworth x Berkshire (old type).
No. 4. Tamworth x Large Black.
No. 5. Tamworth x Mid York.
No. 6. Canadian Berkshire x Mid York.
No. 7. Large White x Berkshire (Canadian x old type).
No. 8. Canadian Berkshire x Large Black.

Although two of the crosses, Tamworth x Large Black and Canadian Berkshire x Large Black, are unusual and not likely to become popular, they serve the good purpose of comparison with others that are more common and may be seen at times in any of the saleyards.

To carry out the test, all groups consisted of six pigs, with the exception of the Canadian Berkshire x Large Black, where only five were available. The pigs were fed to a bacon weight, and, at the completion of feeding, four from each group were slaughtered at the Produce Depot, Port Adelaide, and the carcasses shipped to England.

It was recognised that, to provide a carcass carrying a wealth of lean meat, the animal must be fed a ration containing a relatively high proportion of protein. For this reason in the feeding of the different groups, supplementary foods such as meat meal, lucerne, and skim milk were used wherever possible, and according to circumstances, in conjunction with a grain mixture of wheat, barley, and pease.

Criticism of Carcasses.—On arrival in England, all carcasses were critically examined with respect to their suitability for trade purposes.

Lots No. 1, 2, and 3, Large White x Tamworth x Berkshire (old type), Large White x Berkshire (old type), and Tamworth x Berkshire (old type) were shipped to London by the s.s. *Hobson's Bay*.

At the request of the Agent-General, Mr. Whitney, of the Stockbreeders Meat Company, made the following comments:—

> "All these pigs were very good baconers and suitable for the United Kingdom trade. It is considered that the double cross, Large White x Tamworth x Berkshire, had a slight advantage over the single cross, and, further, the Tamworth x Berkshire cross is a little better than the Large White x Berkshire cross owing to the fact that the pigs are leaner and not so heavy at the shoulder."

Lot 4, Tamworth x Large Black, shipped to London by the s.s. *Waimana* inspected by the Agent-General on arrival.

Mr. McCann made the following report:—

> "The cross Tamworth x Large Black gave them length of bacon side which has much to commend, and I was agreeably impressed with the hindquarters or ham proportions, also the firmness of shoulder.
>
> "Condition was just right, but length of leg is apt to discount the true proportions of the body to the eye. The black hair showed up very plainly on the rind and would, to a degree, depreciate the value. This opens up the question of the use of singeing. I am of opinion that wherever black coloured pigs were used, the singeing must be resorted to when it is intended that the carcasses are to be used for bacon production.
>
> "These pigs were well dressed, but no matter how well dressing has been performed, the rind shows up dark and unsightly unless singed."

Lots 5, 6, 7, and 8, Tamworth x Mid York, Canadian Berkshire x Mid York, Large White x Bershire (Canadian x old type), and Canadian Berkshire x Large Black, shipped to London by s.s. *Barrabool,* inspected by Agent-General on arrival. As with the previous shipment, Mr. McCann gave a comprehensive report as follows:—

Lot 7. Large White x Berkshire (Canadian x old type).

"These are nice pigs. Very good length of bacon side, with plump, well filled loins. Ribs well sprung. Perhaps they could have been improved with finer shoulders, but this is a Berkshire characteristic. The quality of the rind was excellent. Condition was in accordance with modern trade requirements.

"Fighting marks and thicker shoulders than one would have liked spoilt a really good sample of what the trade to-day demands, but it appears that the cross will be acceptable. Points warded, 90."

Lot 5. Tamworth x Mid York.

"The pigs stripped very attractively, despite fight marks. The hams were good, but the length of bacon side was not as good in these exhibits as that of the Large White x Berkshire cross. The quality of the rind was very good, and general outward appearance pleasing. Condition was just about right. It would appear that this is also a cross quite acceptable to buyers here Points awarded, 88."

Lot 6 Canadian Berkshire x Mid York.

"Very nice pigs, but irregular in condition, one carcass grossly fat. Hams good, but varying in shape. Shoulders finer than in other crosses. No real reason for serious criticism, good length side, rind variable. Suitable type for export, but not just quite as likeable as previous lots. Points awarded, 86."

Lot 7. Canadian Berkshire x Large Black.

"Shoulders fine, condition satisfactory, rind variable, some coarse with hard black hairs showing through. Length of side good. Type quite acceptable to trade if better scraped or singed. Points awarded, 83."

Mr. McCann also made the general comment, that in general conformation all pigs would compare very favourably with what the market is asking for. Unfortunately the carcasses were very badly marked, apparently due to fighting before slaughter. The scarred sides look very unattractive, and it will affect marketing. Those responsible for scalding want to ensure that the water is exactly the right temperature before pigs are immersed, otherwise they are bound to vary and scraping can never be satisfactorily done, particularly with black haired pigs.

Continuing, Mr. McCann states that England and Australia are facing similar problems in pig production, because the modern butcher is demanding a long, lean pig. Both England and Australia are blessed with too many breeds which in the old days all had their particular virtue, but which to-day are unsuited for modern butchers' requirements. Unfortunately the scrapping of all breeds unsuitable, such as Denmark, Lithuania, and Northern Ireland have done, to permit of the production of one particular breed or cross, cannot be undertaken, consequently type must be evolved by a combination of the breeds in existence.

With Large and Mid White, Tamworth and Canadian Berkshire available for crossing, or even straight breeding, it would be possible, with rigorous selectivity for South Australia to give British buyers the type they demand.

Export Lambs

The following is a verbatim report of a brief discussion by Mr. R. C. Scott, Chief Agricultural Adviser (given through 5CL Broadcasting Station), on the Export Lamb Trade in South Australia.

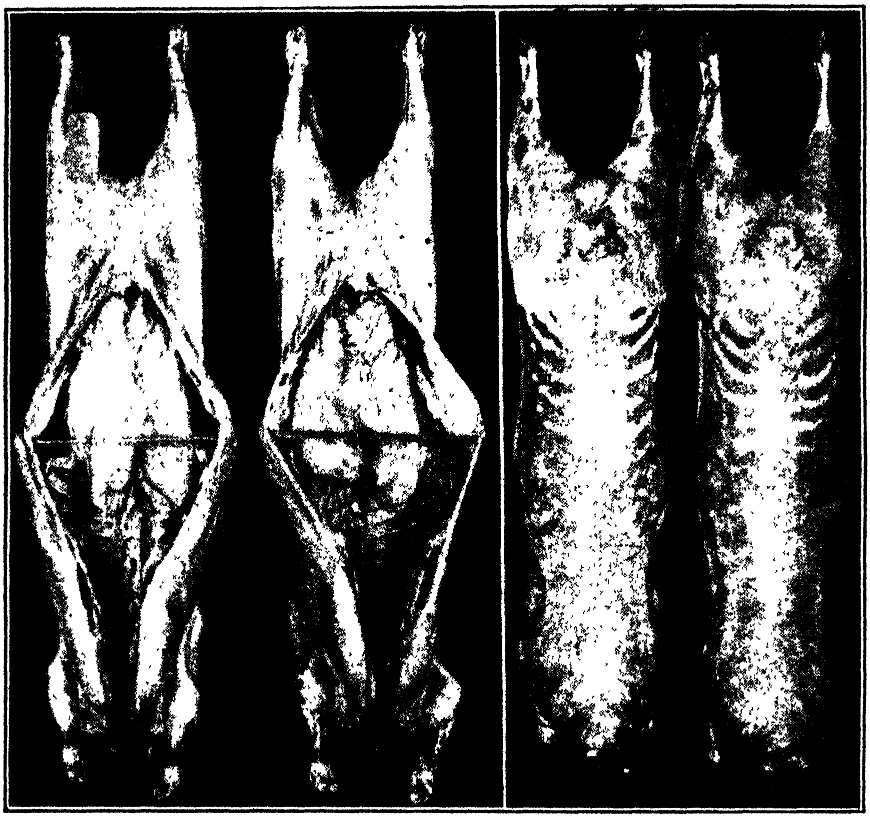
So far as the disposal of lambs for slaughter is concerned there are two very distinct and definite markets, namely, the local or home consumption market and the export or overseas market. At the present time the former, that is to say the local market, absorbs the greater number of lambs. For the five-year period, 1930-35, an average number of 381,000 lamb carcasses was consumed each year in South Australia, whilst for the same period a mean total of 281,000 carcasses was exported from Port Adelaide, and approximately 60,000 South Australian lambs from Portland in Victoria.

The year 1935 was a record export lamb season in this State, and 343,000 carcasses were shipped by the Produce Department at Port Adelaide, but at the same time 392,000 carcasses were consumed locally.

Lambs by Southdown from Merino-English Leicester Ewes, bred at Roseworthy Agricultural College These lambs exhibit quality and conformation, and are quite equal to the best produced in New Zealand

It will be realised, therefore, that the production of lambs for the local trade is a most important division of the industry, but the number so utilised each year must remain more or less constant. On the other hand, the lamb raising industry, generally, is expanding and the only outlet for the surplus over and above local requirements is by shipment overseas. It follows that if we are to establish ourselves in the meat markets of the world we must produce the type of lamb required. The export market is not a vacuum into which any class of carcass can be thrown, and it is necessary to ship an article which will displace produce not quite up to the standard, and compete strongly with the best.

The home market can look after itself and will absorb lambs which, although prime and good quality, do not fully comply with overseas requirements regarding weight and conformation. Consequently, wheatgrowing farms—where early maturity is most important because fallowing operations steadily reduce the grazing area available for the flock—will continue to raise animals for local consumption, but, on the other hand, all who market their lambs during the export season, that is to say, from about August to December, should concentrate on the production of carcasses most suited to the English market. The demand generally — and specially in the Smithfield market—is for a lamb weighing 36lbs. or under, with short fleshy legs and shoulders, well developed meaty loins and with fat evenly distributed throughout the body. The country which has attained greatest success in producing this type of lamb is New Zealand, and, therefore, it is of interest to examine the methods adopted in the Dominion, and see how far they can be applied in South Australia. The dam of the New Zealand export lamb is almost invariably a Crossbred and the sire a Southdown.



Good Quality Export Carcasses. About 85 per cent of the carcasses exported from New Zealand are of this type. South Australia exports about 34 per cent. of this grade and an increased percentage is necessary if a good reputation is to be established in the English meat market.

The Crossbreds of that country are practically pure Romney Marsh sheep, but the name has been retained because of their origin. The Crossbred has been built up from the original Merinos, and in the early days the English Leicester, Lincoln, Romney Marsh, and Cheviot were crossed with this breed. The Cheviots and English Leicesters were the first to drop out of favour, whilst with a lower demand for strong wool the Lincolns lost ground, leaving the mating almost entirely to Romney Marsh rams.

Therefore, the New Zealand Crossbred to day is principally of Romney Marsh blood, although other breeds are included amongst her ancestors. This class of sheep is bred in the hilly country and the ewes sold to the fat lamb breeders on the plains. Without exception, the Southdown sire is used because experience has shown that this breed stamps neatness and conformation on his progeny to a greater extent than the other mutton breeds available, and, consequently, his lambs yield the highest percentage of carcasses of "Down" type.

Lambs by Southdown from Merino-Border Leicester Ewes, bred at Roseworthy Agricultural College These may be regarded as the class of lamb required overseas.

It is this uniformity of production that is the most striking feature of the New lambs. In this connection it may be Zealand lamb-raising industry, and it is particularly impressing to visit the various freezing works and see row after row of carcasses, all identical, all of similar type, weight, and conformation.

There is a number of other important points connected with management and marketing, but it is this more or less standardised line of breeding which provides the greatest example of what is required for the successful shipment of interesting to know that New Zealand shipped 9,383,000 carcasses of lamb last year. Just consider how enormous this number is in comparison with the record export of 343,000 carcasses consigned from South Australia in the same season.

In addition, 85 per cent. were graded as first quality, whilst with our lambs only 34 per cent. were placed in this class. However, so far as quality is concerned it is not altogether a matter of breeding, and very much depends upon the management of the flock. Here again, New Zealand can provide an example, as much care is exercised in management and marketing. Every effort is made to avoid checking the development of lamb during their growing period, whilst great attention is given to primeness of condition at the time of consignment to the freezers. It is the general rule for every animal to be handled before it leaves the farm and the quality judged in that way, rather than determined by the eye as the lamb runs up the race. Therefore, the main points with regard to the New Zealand export lamb are uniformity, management, and marketing, and it now remains to be seen what can be done on these lines in this State As has been said, the majority of lambs for local consumption in South Australia will continue to be raised in our wheatgrowing areas, but to-day our agricultural expansion is taking place in the higher rainfall districts with pasture production the most important operation Whilst some dairying will occur, much of the pasture will be consumed by fat lamb breeding flocks, and the lambs thus produced marketed during the export season This means that they must be of the export type if maximum values are to be expected.

In such districts, the Merino is not well suited, and therefore we can follow the New Zealand practice and use a Longwool type of mother. In this connection, the Corriedale has much to recommend her. The Corriedale is an established breed. The ewes are prolific and good mothers, and it will be of advantage to the industry when annual sales of Corriedale ewes are regularly held during the year and, at these sales, fat lamb breeders can obtain their requirements It is a breed which is rapidly increasing in popularity, and to-day, the Government Statist records that there are upwards of 80,000 Corriedale sheep in the State.

However, if Corriedales are not available as the basis for the export lamb flock, a half-bred Merino-Longwool mother should be obtained. For choice, the Merino-Border Leicester, although generally speaking, in the higher rainfall areas, there would not be much variation in the productive value of any of the Longwool halfbreds. The next alternative is a Comeback ewe, but it must be remembered that the greater the proportion of Merino blood the greater is the influence on the conformation of the progeny and the mothering ability of the dam. To a certain extent the export lamb breeder is governed by circumstances in the choice of dam, but such is not the case in his choice of sire, and there can be no question that the Southdown is the best breed available. The Southdown stamps on his progeny those qualities required in the English market and must be utilised if the highest percentage of first quality carcasses is to be expected. In the matter of management, conservation of fodder in the form of hay or ensilage is essential, since, under local climatic conditions, a flush of feed is experienced in the late spring, and a shortage occurs in the autumn If this surplus is conserved, provision is thus made for carrying the flock through the lean period of the year with minimum loss Finally, in the question of marketing only prime lambs should be consigned and the earlier sale on the hooks, instead of through the livestock markets, becomes the regular method of disposal in South Australia, the sooner will rejections for bruises, etc, be reduced to a minimum. To summarise the position, the main factors necessary for the production of an even line of export lambs from our higher rainfall areas appear to be:—

1. Corriedale or half-bred longwool ewes.
2. Southdown rams
3. Conservation of fodder.
4. Careful marketing

If methods were standardised on these lines, South Australian lambs would command a high reputation overseas since there is no doubt that the best lambs produced to-day are at least equal to the best raised in New Zealand or any other country, but the trouble is that the proportion of these first class lambs is not as high as it should be.

Production of Butter and Cheese.

The production of butter and cheese for August, 1936, was:—Butter, 1,506,841lbs.; cheese, 979,577lbs.

Subterranean Clover—Its History in South Australia

[By Rowland Hill, District Agricultural Adviser.]

Having lived my boyhood days from 1895 to 1912 at Blakiston, and, in later years, had that district and much of the high rainfall country in the State to attend to as an Agricultural Adviser with the Department of Agriculture I feel that I should attempt to record some of the history of that wonderful leguminous plant —Subterranean Clover. Subterranean Clover (*Trifolium subterraneum*), at the present time, is well known throughout the Commonwealth and New Zealand as an outstanding pasture plant and soil builder, that has revolutionised the farming practices in the high rainfall country, and has converted large areas of previously despised virgin land into highly productive pastures.

Further than that, land abandoned for cultivation purposes because of its low fertility, has, by the medium of this legume, been rehabilitated to a degree exceeding the expectations of the keenest optimist and, provided it is correctly handled in a course of sound rotation, will allow agriculturists to adopt a system of intensified farming with safety.

The late Mr. A. W Howard.

South Australian agriculturists have been ever ready to realise quickly the value of sound cultural methods, the use of fertilisers and the necessity to practise rotation of cropping, but, so far as the high rainfall districts are concerned, the acceptance of Subterranean Clover as a soil improver marks the acme of advancement.

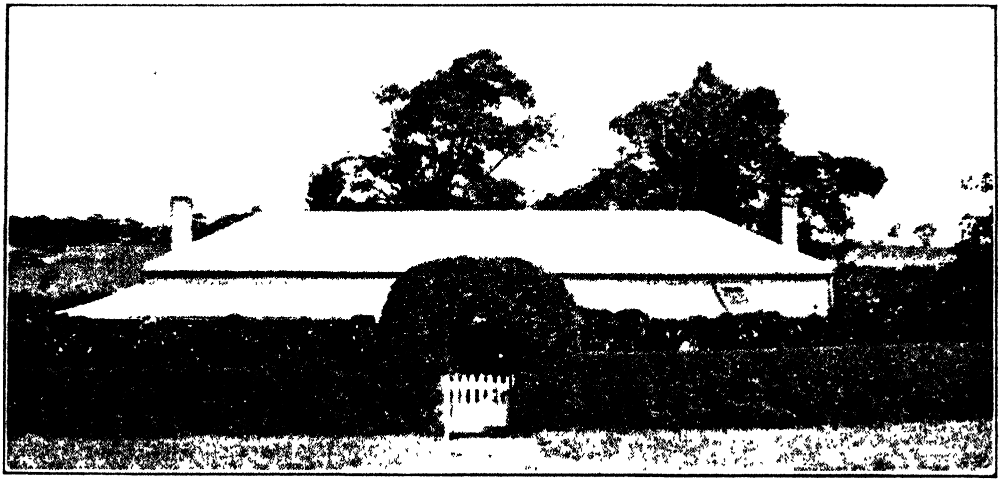
Searching inquiries have convinced me that the plant existed on several farms in the Mount Barker and surrounding districts in the very early days of settlement and, although recognised as a palatable and nutritious food for livestock, its name was not known and its growth was very limited.

The Discovery of the Plant.

In 1876 Mr. Amos William Howard, born at Watford, Hertfordshire, England, on 31st May, 1848, arrived in South Australia on the immigrant ship "Lightning" which ran aground on the Troubridge Shoal in the Gulf and, it is interesting to relate, Mr. T. Bellchambers—afterwards so well known in connection with the Humbug Scrub Sanctuary—was a fellow passenger.

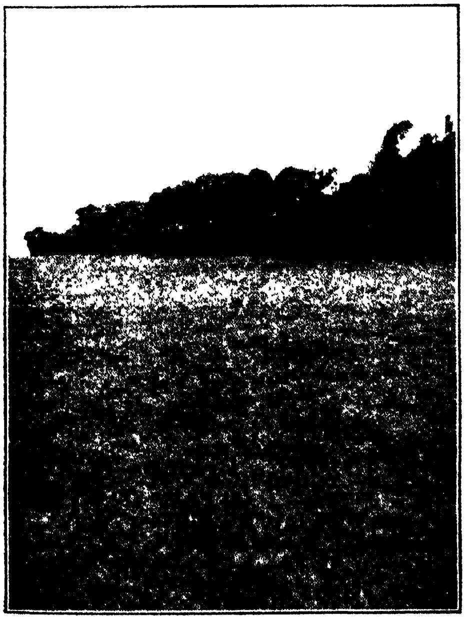
It was in 1889 that Mr. Howard arrived at Blakiston with his family and, in later years, established himself as a florist and nurseryman on the property known as "Beauvale." The house at "Beauvale" was originally the old Dublin Castle Inn and is now 99 years of age, being still occupied by the Howard family. I had often discussed the possibilities of Subterranean Clover with Mr. Howard who informed me that his attention was attracted to the growth of the plant in about the year 1889 on the late Mr. Michael Daley's property adjoining the Mount Barker Springs and Nairne roads and now owned by the Warland family.

He explained that he visited the property with the intention of purchasing a cow from Mr. Daley who was a livestock dealer, but on finding that gentleman not at home, he strolled along one of the valleys in order to fill in time until the owner returned.



"Beauvale"

It was during that time that he made acquaintance with the plant and quickly realised its value, although not knowing its name. A short time after this, he found the clover growing on his own property, also on many surrounding farms and lost no time in expressing his opinion of its worth.



Scrub land converted to Pasture with Subterranean Clover.

As substantiation of this date, we have record of his letter to the press in January, 1906, when he wrote:—

"In your issue of 17th January appears an article on plants that gather nitrogen by the aid of bacteria on the roots. I do not believe that inoculation of the soil with artificially cultivated bacteria will be successful, except in specially suitable patches of soil. In the Mount Barker district we have a weed which I believe will go far to solve the problem of introducing nitrogen into the soil. This plant is an annual one of the trefoil family. It first made its appearance in a grass paddock at Blakiston some 12 or more years ago, and now it may be seen in most of the grazing paddocks in the district. Although it may be well known to some botanists, the nearest approach to a name for it that I have been able to get is *Trifolium subterraneum*. Whatever its botanical name may be it is here called a clover."

Referring later to this letter in 1909 Mr. Howard stated:—

"I strongly recommend this clover and am pretty sure that never before had it been mentioned in connection with agriculture. I took a sample of the plant to Mr. W. Champion Hackett, requesting him to assist in ascertaining its botanical name. This he kindly did, tracing it in Smith's English Botany as a very insignificant weed growing in poor soils. At this time it was unknown to any seedsman in Europe or Australia as a fodder plant; neither had it been catalogued.

"The 'Advertiser' printed the name of *Trifolium subterraneum* for the first time as a fodder plant, and Messrs. E. & W. Hackett, seedsmen of Adelaide were the first to catalogue it, and I was the first to bring it to public notice."

As previously mentioned, there is no doubt that the legume had been quite prevalent in that vicinity for many years before Mr. Howard drew attention to its possibilities, but his article just quoted appears to be the earliest recorded data which undoubtedly was the embryo of its popularity.

In 1900, Mr. Howard presented a few pounds of seed to my father who had it sown on portion of the property now owned by Mr. L. T. Cowan of Blakiston, and it quickly made headway, producing a splendid cut of meadow hay.

Harvesting the Seed.

It was in that year that the first serious effort to harvest the seed was made and I can remember the fruitless attempts of Messrs. Tom O'Donnel and the late Johnny O'Neil, who were employed by Mr. Howard to thresh out the seed with a flail.

Various methods of threshing were employed without success, and eventually surface rakings of the plant were put through a hand chaff-cutter and the chaff winnowed to divide the pods from the straw, but freeing the seeds from the pods presented difficulties. However, by hand rubbing and the use of sieves some clean seed was prepared and small quantities sold in 1903 at the price of 2s. per pound.

Two years later, in 1905, Mr. Howard approached Mr. F. I. Dutch of Mount Barker with the hope of having a machine made to facilitate the cleaning process and in that year, a huller which was worked by two men was built.

Subterranean Clover Pasture at Mount Crawford.

Patience and hard work were rewarded when the machine was adjusted to do the work successfully and the use of a horse-works to drive the chaff-cutter and huller marked another step of progress.

I am greatly indebted to the Misses Howard of Blakiston who allowed me the privilege of perusing portion of their late father's diary in which, amongst other items of interest, was the first recorded sale of clover seed. The item was:—"30lbs. of clean clover seed to Messrs. E. & W. Hackett and Company on 18th January, 1906, at 2s. 6d. per pound."

Thus, it seems very evident that this item records the first sale of Subterranean clover seed commercially, although small quantities had been collected by Mr. Howard and samples for trial distributed to all parts of Australia, New Zealand and South

Africa. Most of the seed was collected from the surface growth of plants up to this time and a sharp shovel was employed to gather the material together, but later, the surface soil and buried pods were included.

The pods were separated from the soil with a winnower, and the clean pods treated through the huller before being treated through the winnower to obtain clean seed. As a final process in those days, the seed was washed free from dust in

An early attempt at mechanical cleaning of Subterranean Clover seed at "Beauvale.'

Another use for Subterranean Clover. Making Silage at Charleston.

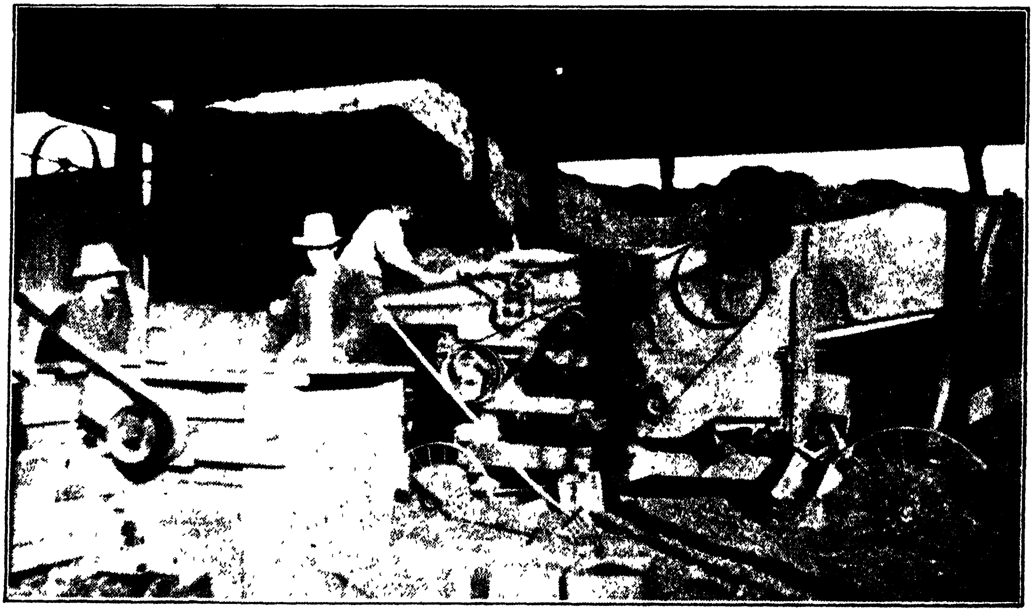
Men employed to rake and clean Subterranean Clover seed at "Beauvale."

order that it might be presented in a brighter condition.

So the work went on at the "Beauvale" farm with the output increasing very slowly, but Mr. Howard, full of enthusiasm and ever ready to stress the importance of the legume and its possibilities for the future, did all in his power to give it publicity through the press and other channels he found possible.

Reference to his diary shows that he had realised the value of top-dressing with fertilizers and, in 1908, he had plans showing the portion of his farm treated in that manner.

Attention is also drawn to a paragraph in the "Garden and Field" of June, 1908, which stated that Mr. Hawker was already a great believer in *Trifolium subterraneum* and was planting it on his lower north station.



The Stirling Thresher and a Huller in the foreground, working at "Beauvale."

Figures collected by statisticians show that, in the year 1916-17, 5cwts. of seed were collected and that the industry came very much into prominence in 1923-24 when 807cwts. of seed were harvested. From that time onwards, large quantities of seed have been collected each season, reaching as high as 5,082cwts. in 1929-30.

That the industry has become an important one in South Australia will be seen from the following Table which shows the area raked and the total seed collected in each season from 1916-17 to 1934-35:—

Subterranean Clover Seed Collected from 1916-17 *to* 1934-35 *and Area Harvested.*

Year.	Clover Seed. In Cwts.	Acres.
1916-17 .. .	5	10
1917-18	24	21
1918-19	—	—
1919-20	73	39
1920-21	30	11
1921-22 ..	104	38
1922-23	23	62
1923-24	807	405
1924-25 . . .	1,318	681
1925-26	1,160	473
1926-27	1,533	795
1927-28 . ..	1,284	630
1928-29 .	3,526	1,270
1929-30	5,082	1,736
1930-31	2,320	831
1931-32 .	921	429
1932-33	2,813	965
1933-34	1,224	1,262
1934-35	1,792	1,768

Mechanical Cleaning.

It was in 1920 or 1921 that the Stirling thresher was brought into use, but it was not a great success, although an improvement on previous methods.

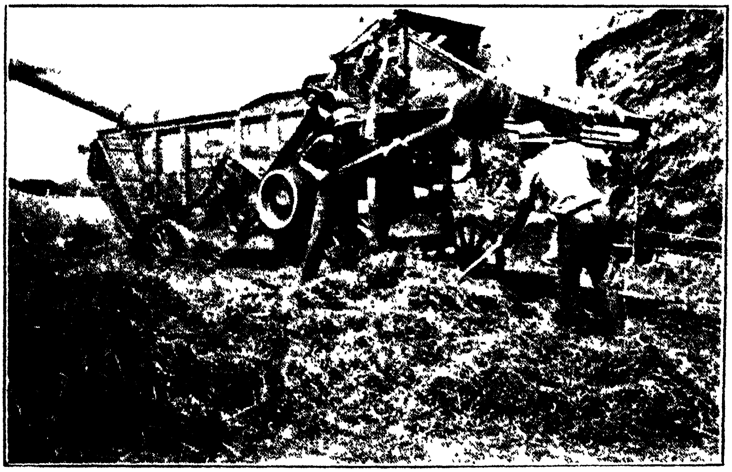
The Huller which was then being made by Dutch Bros. of Mount Barker still had to be used to assist in the cleaning process.

Horse rakes were used to collect the top growth and hand rakes, with a duck-bill point to the teeth, were employed to collect the buried pods.

This necessitated an enormous amount of hand labour which proved to be very costly, but the demand for seed caused the price to rise and, in 1923, it reached as high as 6s. 6d. per pound. Suitable fields were rented for the right to collect seed and as much as £10 per acre were paid—£7 were quite frequently given.

In 1923, a son of Mr. Howard—Mr. Cecil Howard— imported a clover huller from the Birdsell Manufacturing Company of America, which did the complete work of threshing and hulling, successfully assisting in an enormous increase in the output of seed from 23cwts. in 1922-23 to 807cwts. in 1923-24.

Messrs. Kaesler Bros. of Hahndorf—keen and progressive engineers—built their first thresher and huller in 1925 and have continued to improve it to the present



The Birdsell Huller, imported by Mr. Cecil Howard.

The Thresher and Huller built by Messrs Kaesler Bros, of Hahndorf.

day, helping the clover seed industry enormously.

Mr. Frank Daniel of Mount Barker also built a machine for the same purpose in 1929 and a larger improved pattern in 1931.

These machines have a capacity of treating from 25 to 35 cwts. of clean seed per day.

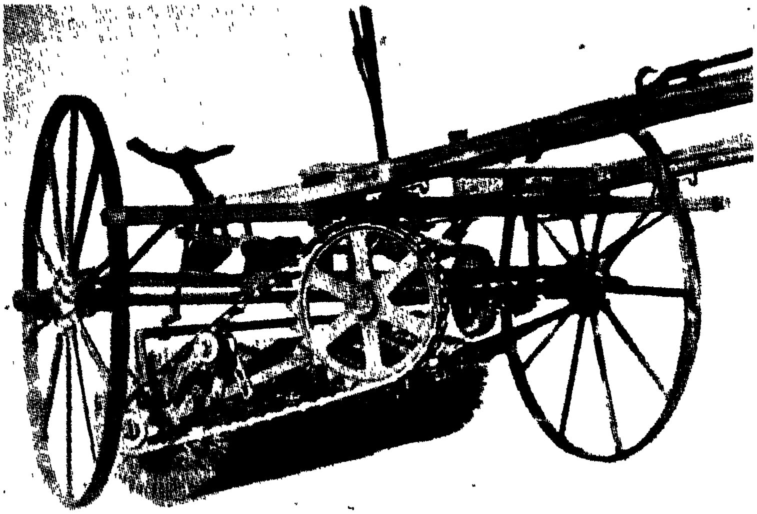
Contracts to thresh and clean seed were undertaken in order to reduce the overhead costs of the smaller growers, thus helping the industry.

Various devices have been made to assist in grading and preparing the seed for market, until at the present time, the industry is on a sound footing so long as prices remain in the vicinity of 1s. per lb. for first grade seed.

In order to keep pace with the improvement in threshing and cleaning methods, attention has been directed to facilitating the collection of pods to supply the thresher. Implements employed have been the Campbell Horse Rake, Road Grader and, later, the Revolving Road Broom drawn by horses.

At the present time, the Campbell Rake is used to collect the surface growth and this is followed by sweeping with the Revolving Broom with considerable pressure applied, sweeping the pods and some surface soil into rows from which it is collected on to trollies and stacked ready for threshing, or carted direct to the thresher.

F. Daniel's Huller working with a 15/30 h.p. Tractor.



Clover Broom, made by Port Adelaide Implement Works.

So the work of the Subterranean Clover industry goes on, with each season finding individuals discovering some improvement in the methods adopted. Clover seed continues to be distributed in large quantities all over Australia and to New Zealand, to take its important part in agriculture and it will continue to do so for many years to come. Let us hope that the importance of Mr. Howard's foresight will be impressed upon the minds of South Australians more and more, and that Subterranean Clover will be utilised to exploit the undeveloped resources in our high rainfall districts.

To-day, we find scores of farmers from the lower rainfall districts seeking

The Campbell Clover Rake.

properties in the higher and surer rainfall areas and the movement is one to be encouraged, but the eagerness of farmers to make the change is definitely a result of Subterranean Clover making economic development of this country possible.

pasture plant capable of converting huge areas of our present scrub country into prosperous rural districts.

The sound advice in Mr. Howard's letters to the press 30 years ago has borne fruit, but the large areas of land with a suitable rainfall still remaining in their virgin state, cannot be considered a fitting memorial to one who so ably blazed the trail in introducing Subterranean Clover.

A stack of Subterranean Clover, 95yds x 7yds x 25ft high, from which 10 tons of seed were threshed.

The Clover seed industry has become important, but the revenue point of view is only secondary to the importance of Subterranean Clover as a soil improver and a

Lice in Horses.

The Secretary of the Blackheath Branch of the Agricultural Bureau reports that horses on the farm of one of the members are troubled with "itch," evidenced by the animals continually rubbing themselves against posts, fences, &c. Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S. (Deputy Chief Inspector of Stock), on being asked to suggest a remedy, said the itch is probably due to the presence either of lice or a minute parasite which lives on grass, hay, &c. In the case of lice, they are easily seen if an examination of the skin is made, when they will be observed sticking into the skin with their heads buried. They are a bluish-grey colour and breathe through pores in the body, and they are usually found on horses with long, rough coats. Treatment for lice: Apply oil, preferably a vegetable oil such as linseed (raw) or cottonseed. Such oily applications block the body pores through which the parasite breathes and suffocate it. An itch very common in this State is due to a small parasite which principally attacks those parts covered with long hair such as the legs and mane. An oily application in which is mixed 2 tablespoons of Lysol or Kerol to each pint well rubbed in with a body brush is effective and should be repeated in 3 or 4 days' time. In many parts of the State horse dipping baths have been put down, and the horses put into them are stood in a solution of disinfectant for 15 minutes.

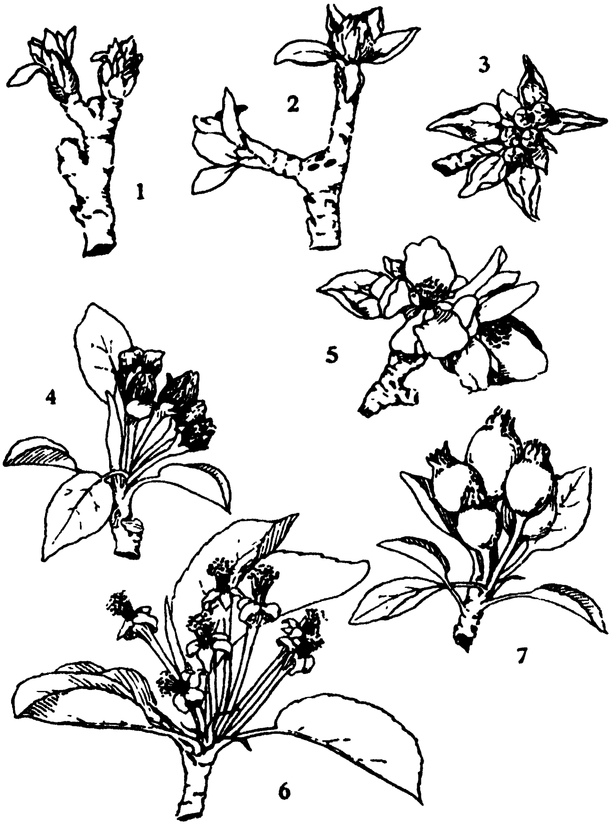
Apple Scab

The Horticultural Division of the Department of Agriculture has supplied the following notes dealing with the Control of Apple Scab under South Australian conditions.

Life History of the Fungus is Important.

Effective control of scab depends very largely upon clear understanding of the life cycle of the pest throughout the year. Under South Australian conditions, the disease is virtually confined to foliage and fruit, and when fruit has been harvested and leaves have fallen, the tree is to all intents free from the disease for the ensuing winter period. The fungus spends the colder months in dead leaves on the ground, and does not again become active until warmer conditions prevail.

Spring Spores.—Towards spring the over-wintering fungus in the dead and fallen leaves becomes active and forms very minute sacs which contain spores. As these spore sacs mature under the influence of warm spring temperatures, they become absorbent to water and during rainy periods will swell and burst, shooting millions of tiny spores into the air. These spores may be termed spring spores, and when forcibly ejected during rainy spells are picked up by wind and air currents and carried back to the trees, where they may set up new season's scab on opening buds, developing blossoms, &c.



[From *Plant Protection*, D. G. H. Cunningham.

STAGES OF BLOSSOM DEVELOPMENT OF THE APPLE.

Green-tip (1); tight cluster (2); open cluster (3); pink (4); full bloom (5); petal fall (6); calyx closed (7).

Several important points should be noted concerning these spring spores:—

(1) The mature bark of apple and pear trees is apparently resistant to infection, therefore, spring spores ejected prior to bud burst can do no harm at all, and sprays applied before bud burst are of little or no value.

(2) The period of release of spring spores is very limited, and except possibly in the case of our wettest districts, spring spores are of no importance after blooming period.

(3) Spring spores are only shot into the air during rain, and, further, can only infect newly opened buds, &c., if free water remains on the new growth for a period of at least 6 to 8 hours. Such necessary conditions are more frequent early in the season.

(4) Spring spores are the only important means by which the disease can re-establish itself on trees in early spring.

Summer Spores.—Once a spring spore is established on the tissue of open buds or blooms, a minute scab spot is formed. Although such spot may be quite unnoticed at the time, it is nevertheless capable of giving rise to large numbers of a different kind of spore, known as *summer spores*. These summer spores spread the disease after preliminary infection, and it should be noted that—

(1) The summer spores are almost entirely carried by water—as distinct from spring spores which are carried in air currents.

(2) They arise from an initial infection caused by spring spores, and given enough moisture to run from the initial scab spot to another situation, may cause spread of the disease at any time during the growing period.

Considerations Regarding Control.

It has been shown that there are two kinds of spores to combat. As summer spores can only occur after a successful infection by spring spores, it is obvious that first lines of control should be directed at preventing spring spore infection. By partially preventing the unnoticed spring spore infection, the spread during later rains by means of summer spores may be considerably reduced.

Growers have no doubt observed that the greater proportion of scabby fruit shows scabs situated around the calyx of the fruit and extending therefrom towards the stem of the fruit. In nearly every case, these scabs have resulted from washing down of summer spores from an early calyx infection, which passed unnoticed.

Heavy mist or even dew will wet the fruit sufficiently to carry summer spores down on to the cheek of the apple, and infection will result if the weather is so muggy that the fruit stays damp for 6 to 8 hours. These conditions occurred in late November last season and caused considerable damage.

The calyx is one of the first tissues of the flower and ultimate fruit which is exposed at bud burst; the younger it is the more susceptible it is to infection by spring spores which may be shot into the air at that time.

It is, therefore, most important to apply the first protective spray when a majority of the blossom buds are showing a green tip.

The greater part of the calyx infection arises between bud burst and the pink stage. The green tip spray is undoubtedly the most important single spray in scab control.

It is furthermore desirable to complete ploughing before buds burst, so that dead leaves which give rise to spring spores will be, as far as possible, buried, and therefore unable to release their load of trouble. Clean up along the fence lines and around the trunks. It is from such sheltered positions that most of the spring spores arise, especially later when they can do most damage.

There is ample evidence of the importance of the green-tip spray. Two illustrations which occurred in the spring of 1935 may be quoted.

At Balhannah.—A grower applied a green-tip spray to a row of Granny Smith apples—a scab susceptible variety—but not to other varieties. In early November, following a spell of muggy weather, scab developed with rapidity in this orchard, but the Granny Smiths (although very susceptible to scab) remained cleaner than any other variety.

At Cudlee Creek.—Scab-susceptible varieties such as Cleopatra were given, in many orchards, sprays at green-tip, pink and petal fall. More resistant varieties, such as Jonathan, received the same schedule with the omission of the green-tip application—a programme which in many seasons would keep the fruit clean. At harvest, it was found that Jonathans were more affected by scab than the generally more susceptible variety Cleopatra. The explanation for this apparent anomaly undoubtedly lies in an early calyx infection on the unprotected Jonathans, which infection gave rise to bad extension scabbing when weather conditions favoured spread of black spot later in the season.

Similarly in dry districts, a pink stage spray has been found to keep fruit clean in average seasons, as despite the possible presence of initial calyx infection, dry spring weather does not favour a spread later in the year. However, in the event of unexpected wet weather after blossom and/or petal fall sprays have been applied and the spray programme somewhat relaxed, such initial calyx infection may give rise to very serious scab developments. Such was the case in the spring of 1935.

The foregoing remarks are based on critical experimental work in other States and countries and upon general observation of South Australian conditions; in general, they probably present a fairly accurate picture of the life history of scab in South Australian districts. However, investigations have been commenced in this State with a view to determining such important features as the time and duration of spring spore discharge. Experimental and demonstrational spraying plots are to be conducted in a number of representative districts.

Recommendations.

Pending the results of work which is being initiated this year, the following recommendations are made in regard to control of apple scab:—

(1) In order to minimise primary infection, complete ploughing, if possible, before bud burst.

(2) Spray apples according to the following programmes. It will be noted that a green-tip spray is in all districts considered all important, at least, unless and until experimental work indicates otherwise.

WET DISTRICTS.

(*a*) Bordeaux 6-4-40 when about three-quarter of buds are showing green tips.

(*b*) Lime sulphur, 1 in 40 to 1 in 50, between open cluster and pink.

(*c*) Lime sulphur, 1 in 80, at petal fall.

N.B.—If this spray is combined with arsenate of lead, it is advisable to incorporate 3lbs. of hydrated lime and apply *immediately* after mixing.

(*d*) According to weather conditions, fortnightly applications of lime sulphur, 1 in 80 to 1 in 100.

DRY DISTRICTS.

In normal seasons, a spray at pink stage will give protection owing to drier weather in late spring. However, seasons such as 1935 may occur at any time, and a spray at the green-tip stage is a better insurance than a spray at pink stage.

In districts intermediate between wet and dry, Bordeaux at green-tip may be advantageously followed by lime sulphur at pink, depending on weather conditions.

* * *

Herd Testing Association Formed at Mount Barker.

Mr. H. J. Apps (Senior Dairy Adviser to the Department of Agriculture) canvassed the Mount Barker district recently with the object of forming a Herd Testing Association of local dairymen. As a result of Mr. Apps' effort, a meeting was held at Mount Barker on 5th October, when an association was formed.

Twenty foundation members were enrolled, comprising a total of approximately 500 cows. The following officers were elected:—President—Mr. L. T. Cowan, Blakiston; Vice-Presidents—Messrs. D. H. Wollaston and F. W. B. Luck, of Mount Barker, and Secretary-Recorder—Mr. C. W. Hooper, who holds a Diploma of Agriculture of the Roseworthy Agricultural College.

Testing operations will commence on 1st November.

Changes in the Staff of Department of Agriculture

MR. L. J. COOK, Experimentalist.

Following the promotion of Mr. R. C. Scott to the office of Chief Agricultural Adviser, Mr. L. J. Cook, formerly Manager of the Kybybolite Experiment Station, has been appointed Experimentalist on the staff of the Department of Agriculture.

Since leaving Roseworthy Agricultural College, where he was Gold Medallist in 1910 and was awarded a diploma of the first class with honours in several subjects, Mr. Cook was employed in agricultural practices in wheat and pasture areas, securing practical experience in all the main branches of crop production, livestock husbandry, as well as orchard and irrigation work. He has also been engaged in clearing mallee lands and developing them into improved wheat and pasture areas.

Mr. Cook has been on the staff of the Department of Agriculture for over 20 years, first as Manager of the Minnipa Experimental Farm, and since 1920 he was Manager of the Experiment Station at Kybybolite. He has thus been actively associated with the varied conditions which apply to the farming areas of South Australia. He has a specialty for experimentation and this, together with his wide experience of South Australian agriculture, places him in a position to carry out the experimental work of the Department with the care and attention which it demands.

At Kybybolite, Mr. Cook conducted experimental work of a highly important nature, which has been followed with special interest in this State and in many other parts of the Commonwealth. His reports on pasture work and sheep management at Kybybolite have been recognised as great assistance to settlers in the South-East in directing their stock raising practices and have formed the basis of increasing the carrying capacity of their holdings.

With confidence we look forward to much useful experimental work under Mr. Cook's guidance and to instructive reports which characterised his work at Kybybolite.

MR. WORSLEY C. JOHNSTON, Manager Kybybolite Experiment Station.

Mr. Worsley C. Johnston, who has taken over the management of the Kybybolite Experiment Station in succession to Mr. L. J. Cook, was born on a dairy farm in Western Australia and entered Roseworthy Agricultural College as a student in 1919, where he gained several scholastic distinctions. In his final year he won the Gold Medal and a Diploma of the first class with honours in many subjects. He was also awarded the Morphett Medal in dairying and the Old Students' Cup for Agriculture and Veterinary Hygiene.

Subsequently, Mr. Johnston managed a sheep and wheat farm owned by Senator E. B. Johnston at Kulin, W.A. This farm, consisting of 3,000 acres, was then being developed, and it consequently provided him with practical experience in cropping and sheep management, as well as the handling of workmen, there being a large staff occupied in clearing the holding.

In 1928 Mr. Johnston joined the staff of the S.A. Department of Agriculture as Agricultural Instructor for the Lower North. As an agriculturist he quickly won the confidence of farmers in his district, who freely consulted him before making any innovations or conducting operations of importance on their farms. By a close association with the numerous mixed farming propositions in the Lower North, Mr. Johnston has specialised in the growing and the management of pastures, sheep husbandry, and in other forms of livestock. His wide experience in these spheres of agricultural industries, together with his power of exact observation in experimental agriculture, will ensure the successful management of an experiment station such as that which has been established at Kybybolite.

Mr. Johnston is a fellow of the Royal Society of South Australia.

Statistics

Orchard, Vineyard, and Miscellaneous Crop Statistics, 1935-36. (Figures in parentheses refer to previous season.)

By A. W. Bowden, Acting Government Statist.

I. ORCHARDS.

1. Acreage.—29,122 (29,167) acres, decrease 45 acres; trees of bearing age, 25,320 (25,841) acres. Approximately 803 acres grubbed or died out—mostly in Counties Adelaide, 375 acres; Stanley, 124 acres; Hamley, 70 acres; Hindmarsh, 54 acres; Albert, 35 acres; Eyre, 30 acres; Frome, 26 acres; and Robe, 21 acres. New plantings were 758 acres, chiefly in Counties Adelaide, 600 acres; Stanley, 37 acres; Hindmarsh, 32 acres; and Sturt, 30 acres.

2. Production.—Generally speaking the crops were heavier than the previous year. (*a*) Apples, 939,240 (800,768) bushels; increase 138,472bush.; (*b*) Oranges (calendar year 1935) 645,291 (638,314) bushels, increase 6,977bush.; surpassed the record established the previous year; (*c*) Pears 228,223 (175,966) bushels; increase 52,257bush. (*d*) Apricots, 381,404 (359,816) bushels; increase, 21,588bush. (*e*) Plums and prunes 157,515 (190,365), being 32,850bush. below the record yield of the previous year; (*f*) Peaches 134,586 (146,411) bushels. Details for other fruits are shown in accompanying table.

II. VINEYARDS.

1. Acreage.—54,219 (53,361) acres; increase, 858 acres; vines of bearing age, 51,680 (51,220) acres. About 384 acres grubbed or died out, chiefly in Counties Adelaide, 229 acres; Sturt, 48 acres; River Murray districts, 99 acres; but this was far more than counter-balanced by new plantings—about 1,242 acres—chiefly in Counties Adelaide, 446 acres; Hamley, 351 acres; Albert, 127 acres; Stanley, 98 acres; Light, 89 acres; Sturt, 49 acres, and Hindmarsh, 44 acres. The acreage was described as follows:—For winemaking, 33,851 (33,159) acres; drying, 20,057 (19,847) acres; and Table, 311 (355) acres.

2. Total Grape Yield.—132,559 (147,970) tons; decrease, 15,411 tons. Average per acre of bearing age, 2.59 (2.88) tons; for winemaking, 72,554 (71,126) tons; drying, 59,458 (76,198) tons; and Table, 547 (646) tons.

3. Wine Made.—13,023,587 (12,914,905) gallons; increase 108,682galls. Fortified beverage wine, 6,521,650 (5,544,240); unfortified, 1,223,972 (1,579,653); and distillation, 5,277,965 (5,791,012) gallons.

III. DRIED FRUITS.

1. Currants.—117,415 (185,173) cwts.; decrease, 67,758cwts.—the yield being adversely affected by heavy rains in Murray areas in January.

2. Raisins.—Sultanas, 173,967 (212,514) cwts.; decrease, 38,547cwts. Other raisins, 36,199 (32,165) cwts.; increase, 4,034cwts.

Note.—931 tons of currants and raisins were used in making wine.

3. Other Dried Fruits.—Apricots, 21,183 (20,095) cwts.; plums and prunes, 9,915 (11,423) cwts.; peaches, pears, apples, &c., 9,977 (9,361) cwts.

IV. MISCELLANEOUS.

Market Gardens (including green peas, 1,502 acres), 2,607 (1,994) acres; pumpkins and melons 322 (308) acres, 1,932 (1,767) tons; tomatoes 622 (566) acres, 216,525 (184,067) bushels; potatoes 4,612 (4,664) acres, 19,257 (19,377) tons; onions 342 (397) acres, 3,257 (2,993) tons; other root crops 802 (578) acres, 5,702 (3,244) tons; nurseries, 158 (165) acres. Details for green peas (1,052 acres, 85,758bush.), were separately collected for the first time.

V. OVERSEA EXPORTS.

The value of the total overseas exports of the products of vineyards and orchards for the year 1935-36 was £1,628,227 (£1,523,743); increase, £104,484, the principal items being dried fruits, £570,415 (£656,858); wine, £870,818 (£731,568); apples, £143,608 (£85,269). Complete details of interstate exports are not available, but annually about £600,000 of wine and brandy are exported to the other States.

ARTIFICIAL MANURES USED.

Division.	Area under all Crops, &c.				Manure Used.			
	Total.		Per cent. Manured.		Total.		Average per Acre.	
	1934-35.	1935-36.	1934-35.	1935-36.	1934-35.	1935-36.	1934-35.	1935-36.
	Acres.	Acres.	%	%	Tons.	Tons.	Lbs.	Lbs.
Central	1,013,965	1,032,107	87·97	89·71	41,801	46,045	105·0	111·4
Lower North	995,335	984,611	95·59	96·10	34,002	35,868	80·0	84·9
Upper North	334,921	302,782	63·53	67·23	5,760	5,652	60·6	62·2
South Eastern	98,502	93,313	81·24	79·56	4,114	3,508	115·1	105·8
Western	1,213,282	1,104,082	77·12	80·27	24,390	25,415	53·4	64·2
Murray Mallee	973,298	951,236	90·17	91·36	29,656	31,369	75·7	80·8
Total State	4,629,303	4,468,131	85·32	87·40	139,723	147,854	79·2	84·8
Increase or decrease (–)	–449,255	–161,172	–1·05	2·08	–9,200	8,131	3·1	5·6

MANURES – In addition to 147,854 (139,723) tons manure used for crops as above, 26,739 (17,466) tons were used for top-dressing, the acreage top-dressed being Counties Adelaide, 56,609 (48,125), Carnarvon, 14,056 (7,611), Hindmarsh, 71,958 (50,051), Sturt, 19,584 (14,246), Stanley 13,182 (5,191), Buckingham, 39,492 (26,248), Grey, 103,396 (66,644), MacDonnell, 45,239 (35,710), Robe, 93,420 (70,066), Flinders, 21,971 (8,716), others 57,083 (27,983), total 535,990 (360,591).

NOTE -The maximum percentage of cropped area manured was 92·62 in 1929-30, and the maximum quantity per acre was 93 lbs. in 1926-27 The area of 535,990 acres top-dressed for 1935-36 was a record, the previous highest being 360,591 acres in 1934-35 Since 1931-32, the percentage manured has increased from 80 72 to 87 40, the average lbs. used per acre from 75 3 to 84·8 and the acreage top-dressed from 139,328 to 535,990.

Chick "Sexing"

[By C. F. ANDERSON, Chief Poultry Advisor.]

Examinations in determining the sex of chickens have been conducted throughout the 1936 spring by the Department of Agriculture at the Parafield Poultry Station. The object of the examinations has been to give students the opportunity of showing whether they can put their methods into commercial use.

Chick sexing has made very rapid headway particularly during the last two or three years, and it is estimated that approximately 200,000 chickens have been "sexed" in South Australia this spring.

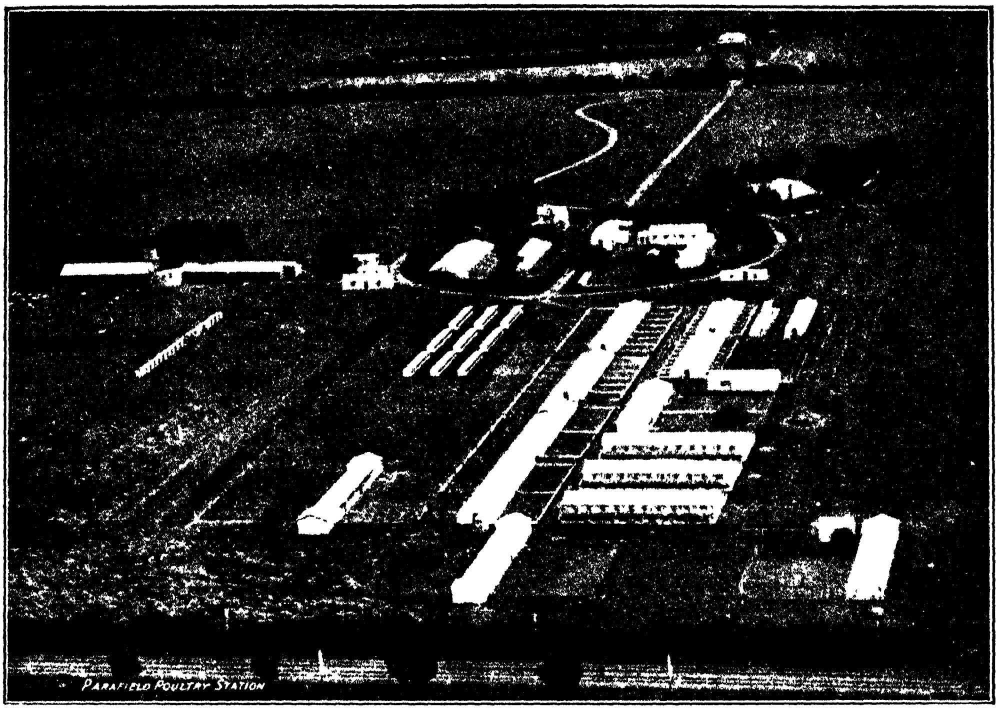
Certificates have been issued by the Department of Agriculture to students who have qualified, and a facsimile of a blank certificate is shown on the opposite page. The conditions are as follows:—

- (*a*) *Special Certificate.*—For those who are able to sex 300 White Leghorn chicks in 45 minutes with an accuracy of 98 per cent. and without killing a chicken or causing injury.
- (*b*) *First Class Certificate.*—For those sexing 200 White Leghorn chickens in 30 minutes with an accuracy of 95 per cent. without killing a chicken or causing injury.
- (*c*) *Second Class Certificate.*—100 White Leghorn chicks to be sexed in 20 minutes with an accuracy of 90 per cent. In the event of more than 1 chicken being killed, or more than 3 being injured, the student will be disqualified.
- (*d*) *Third Class Certificate.*—100 White Leghorn chicks to be sexed in 30 minutes with an accuracy of 90 per cent. In the event of more than 1 chicken being killed, or more than 3 being injured, the student will be disqualified.

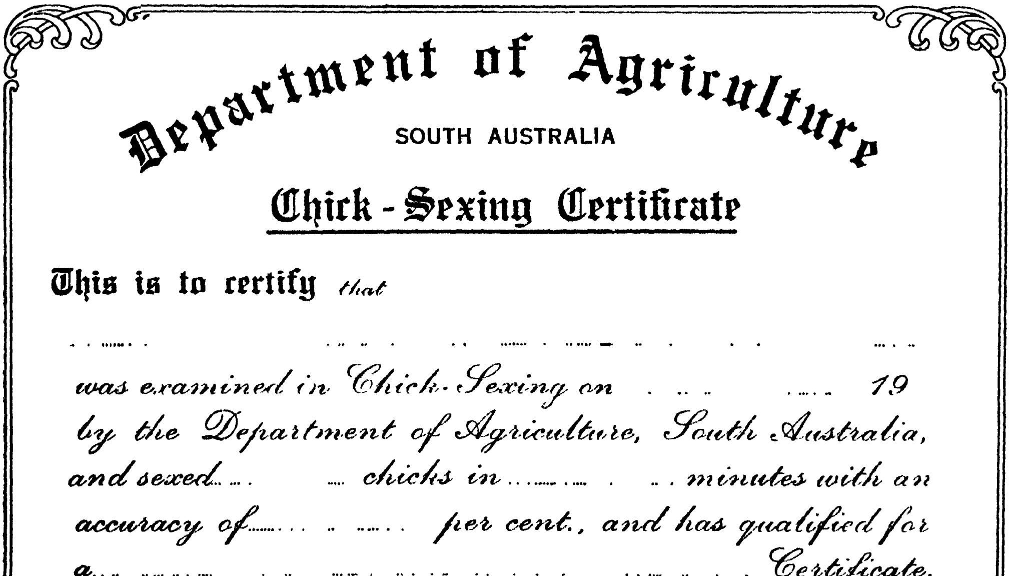
Certificates were gained this year by the following students:—

First Class Certificate.—Mr. R. O. Dawkins, of Gawler, who sexed 200 chicks in 30 minutes with a 98 per cent. accuracy.

Second Class Certificate.—Mr. E. A. Lamerton, of Edwardstown, who sexed 200 chicks in 30 minutes with a 94 per cent. accuracy. Mr. T. V. Gameau, of Murray Bridge, who sexed 100 chicks in 16½ minutes with a 92 per cent. accuracy.



Parafield Poultry Station



Department of Agriculture

SOUTH AUSTRALIA

Chick - Sexing Certificate

This is to certify that

....

was examined in Chick-Sexing on 19

by the Department of Agriculture, South Australia,

and sexed.............. chicks in .... minutes with an

accuracy of.............. per cent., and has qualified for

a.. Certificate.

.... Chief Poultry Adviser

.... Director of Agriculture

Certificate No...................... ....19.....

Agricultural Bureau of South Australia

Conference of Non-Irrigated Fruit Growing Branches

Greenock Agricultural Bureau for the first time since its formation in 1930 held the Conference of Non-Irrigated Fruit-growing Branches of the Agricultural Bureau under its auspices on 3rd November.

Mr. H. O. Helbig presided over a good attendance of delegates from the McLaren Flat, Light's Pass, Lyndoch, Williamstown, Stanley Flat, Blackwood, Lone Pine, Ironbank, Cherry Gardens, and Greenock Branches.

The Opening Address was delivered by Mr. W. J. Spafford (Director of Agriculture).

An excellent Agenda covered a wide range of horticultural and mixed farming subjects including the following papers:—"The Eradication of Convolvulus," Mr. J. A. Lambert (Blackwood); "Lime in the Orchard," Mr. E. R. Radford (Greenock); "Frost Prevention," Mr. J. B. Harris (District Horticultural Adviser); "Gummosis in Apricots," Mr. C. F. Wilksch (Greenock); "Disposing of the Apricot Crop," Mr. W. G. Ahrens (Light's Pass), and questions which were answered by Messrs. W. J. Spafford, A. G. Strickland, M.Sc. (Chief Horticulturist), C. F. Anderson (Chief Poultry Adviser), and H. B. Barlow (Chief Dairy Instructor).

Conference passed the following resolutions:—

"That the next Conference be held at McLaren Flat."

"In view of the fact that saturation of oil content, relative viscosity, volatility of the oil, and nature of the emulsion of the concentrate are regarded by all research workers as significant properties in a spraying oil, it is requested that the Department of Agriculture take steps to have this information made available in connection with spraying oils offered for sale in South Australia."

"That this Conference is strongly in favour of an affirmative vote with regard to the forthcoming referendum."

During the afternoon session, Conference adjourned, and inspected Messrs. B. Seppelt & Sons' Winery at Tanunda.

Conferences at Eyre's Peninsula

Yeelanna.

The Conference of Branches of the Agricultural Bureau in the lower area of Eyre's Peninsula was held at Yeelanna on October 21. Mr. L. E. Clarkson presided over a good attendance and Professor Perkins, representing the Advisory Board of Agriculture, formally opened the proceedings. Mr. W. J. Spafford (Director of Agriculture) and other officers attended to reply to questions and to assist in discussions.

Papers were read as follows:—"Destroying Mallee Scrub," Mr. H. H. Myers (Mount Hope); "Soil Erosion," Mr. T. M. Drummond (Yeelanna); "Lucerne Growing in the Yeelanna District," Mr. R. W. Pearson (Yeelanna); "Production of Fat Lambs," Mr. H. Gibbs (Koppio); "Dairying as applied to sale of cream to factories, and the frozen whole egg industry," Mr. H. C. Brice (Port Lincoln); and "Pig Breeding," Mr. G. Lawrie (Ungarra).

The Conference passed the following resolutions:—That the Government be asked to establish a seed wheat farm on Eyre's Peninsula; That the fertilizer companies be asked to lift the 2s. 6d. per ton extra charge for all superphosphates used on Eyre's Peninsula; That this Conference recommends to the Advisory Board of Agriculture that the Adelaide Congress be held in the latter part of the week prior to the Adelaide Show; That resolutions sent in by branches for Congress should be censored by the Board, with a view to the elimination of overlapping and to placing on the Agenda only such resolutions as are of vital interest to primary production; That the next Conference be held at Ungarra.

Professor Perkins presented a Life Membership Certificate to Mr. A. E. Skipworth in recognition of lengthy service to the Bureau.

In the evening Mr. R. C. Scott (Chief Agricultural Adviser) gave an illustrated address on "New Zealand."

Minnipa.

In the Central District of Eyre's Peninsula a Conference of the Agricultural Bureau was held at Minnipa on 23rd October. Mr. S C. Billinghurst presided and there were present Professor Perkins, who delivered the opening address, the Director of Agriculture (Mr. W. J Spafford) and other officers, as well as delegates from branches at Palabie, Kyancutta, Chilpuddie, Cungena, Minnipa, Windinna, Pinbong, Warramboo, Poochera, Chandada and Yaninee.

Papers were read by Mr. L H. Daniel (Kyancutta) "The Profitableness or otherwise of wheat-growing *versus* sheep in the Marginal Areas;" Mr. O. J. Murphy (Warramboo), "The Subdivision of the holding and its relation to Stock raising," Mr. F. Chilman (Warramboo), "Grassland *versus* Fallow"; Mr. H. E. Broad (Minnipa), "The Value of Sport to the Farming Community."

The following resolutions were carried:—That the Government be asked to extend facilities for dealing with lambs at the Port Lincoln Freezers; That the Minnipa Experimental Farm be retained for seed wheat and stud stock purposes. That Venus Bay be connected by telephone: That the Government be again asked to extend the Tod River mains to outlying centres; That this Conference protests against the extra 2s. 6d. per ton on superphosphate on Eyre's Peninsula: That a Wool Adviser be appointed to the Department of Agriculture; That the next Conference be held at Poochera.

Mr R C. Scott (Chief Agricultural Adviser) gave an illustrated address in the evening on New Zealand

Conference at Alawoona

The Murray Lands East Conference of Branches of the Agricultural Bureau was held at Alawoona on 6th October. Mr. W. Paull (sen.) occupied the chair, members being present from Caliph, Paruna, Wanbi, Taplan, and Alawoona. Mr. A. J. A. Koch (representing the Advisory Board) opened the proceedings, and the following papers were read and discussed:—"Land Values and Production Costs," Mr. T. Vowles (Wanbi); "Mixed Cockying," Mr. A. Petch (Paruna); "Ensilage Making in the Mallee," Mr. J B. Burnett (Caliph); "Poultry," Mr. F. R. Sumner (Paruna).

Other subjects introduced for discussion in which officers of the Department took part were:—"Plants to hold drifting sand," "Top dressing grasslands," "Lamb breeding," "Rugging sheep," "The feeding value of 'Bindy-eye'," "Making rye seed more easily available to farmers," &c.

Mr. C. A Goddard (Assistant Wool Instructor, School of Mines) gave a demonstation of Wool Classing.

Conference resolved·—"That the proprietors of the *Chronicle* be asked to publish in full the paper read by Mr. Vowles at this Conference" "That this Conference forward a request to the Government that a sheep and wool expert be appointed to the Department of Agriculture." "That the 1937 Conference should be held at Taplan."

On the motion of Mr. W H. Todd, seconded by Mr. T Flint, it was decided:—"That this Conference desires to convey to Professor Perkins its appreciation of the services rendered by him during his association with the Department of Agriculture, and trusts that he may be spared to enjoy long life in association with good health."

At the evening session Mr R. C. Scott (Chief Agricultural Advisor) gave an address, illustrated with lantern views, "The Agriculture of New Zealand."

Feeding Tests at Parafield Poultry Station

[By C. F. Anderson, Chief Poultry Adviser.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April, 1935, to 31st October, 1936.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal, 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

5. *Mash*, during autumn and winter.—Crushed barley, crushed wheat, chaffed greenfeed and meatmeal. During spring and summer the mash is varied, bran being substituted for the crushed barley.

Grain.—2ozs. wheat per day.

	No. Eggs Laid 1st April, 1935, to 30th Sept., 1936.	No. Eggs Laid Month of October, 1936.	Total Eggs Laid 1st April, 1935, to 31st October, 1936.
No. 1 Test	10,032	743	10,775
No. 2 Test	10,059	699	10,758
No. 3 Test	10,985	681	11,666
No. 4 Test	8,747	615	9,362
No. 5 Test	9,189	747	9,936

Egg-Laying Competitions

Official Single Test conducted at Parafield

Review of the Competition for the month of October, 1936, by C. F. Anderson (Chief Poultry Adviser) and A. Clifton (Competition Attendant).

The production for October has been good, being slightly higher than that for September. The daily average of eggs laid was 338 as compared with 334 for September. This is rather unusual, as in competition work the month of September is usually the peak period of production. However, it is apparent that the production is a little later this year than in an average year.

One outstanding feature is the decrease in the number of first-grade eggs. The daily average of first-grade is 240 as compared with 265 for the month of September, and as comparatively no hot weather has been experienced during October, the number of first-grade eggs is distinctly disappointing.

A slight alteration in the method of feeding for October was made, the linseed meal being reduced by 50 per cent. during the first two weeks and for the latter part of the month it was discontinued.

In the Wet Mash Section for Leghorns, bird No. 315 owned by Mr. C. A. Maxwell has been the outstanding layer, and she has moved from sixth position to top position for that particular section with a lead of 5 eggs up to the period ending 27th October. This performance shows the importance of the number of first-grade eggs, as this bird has not laid a single underweight egg since the commencement of the competition, and for the month of October laid the fine total of 28 first-grade eggs. Bird No. 346 owned by Mr. J. C. Slee has also forced her way amongst the leading birds with a score of 27 first-grade eggs for the 31 days.

In the Dry Mash Section for Leghorns, bird No. 452 owned by Mr. A. O. Dawkins also laid 28 first-grade eggs for the month. The majority of these eggs weighed 2¼ozs.

The leading bird in the Home Project Section has not laid for the last few days. It is a little difficult to explain this bird's sudden stop in production, as she appears to be in a really good condition and also handles well. The best score in this section was made by Black Orpington No. 497 owned by Master Malcolm Booth, with a score of 28 first-grade eggs.

There were six deaths during the period under review. This is the highest number of deaths for any one month in the competition. It is, however, the usual experience to expect most trouble when the birds are laying heavily.

LEADING SCORES TO 27th OCTOBER, 1936.—FIRST GRADE EGGS ONLY.

SECTION I.—WET MASH.

Class 1.—White Leghorns—351 birds competing.

Singles—	Eggs Laid.	Birds Nos.
C. A. Maxwell	158	315
V. E. Williams	153	109
J. G. Slee	152	346
S. Lambert	152	194
Trios—		
A. O. Dawkins	424	85–87
F. A. Merrett	418	52–54
W. H. L. Norman	417	307–309
Willow Bend Stud Poultry Farm	408	295–297

Class 1—*continued.*

	Eggs Laid.	Birds Nos.
Teams—		
A. O. Dawkins	777	85–90
Willow Bend Stud Poultry Farm	756	295–300
J. C. Normandale	754	235–240

Class 2.—Any other Light Breed (Minorcas)—15 birds competing.

Singles—		
R. M. Yelland	114	371
R. M. Yelland	111	372
V. F. Gameau	111	366
Trios—		
Langmaid and Bettison	269	358–360
R. M. Yelland	231	370–372
V. F. Gameau	199	364–366
Teams—		
Langmaid and Bettison	424	358–360
V. F. Gameau	325	364–369

Class 3.—Black Orpingtons—45 birds competing

Singles—		
Willow Bend Stud Poultry Farm	149	381
A. G. Dawes	145	377
Willow Bend Stud Poultry Farm	141	384
Trios—		
Willow Bend Stud Poultry Farm	417	379–381
Willow Bend Stud Poultry Farm	370	382–384
H. H. Gallagher	365	397–399
Teams—		
Willow Bend Stud Poultry Farm	787	379–384
H. J. Mills	657	385–390
A. G. Dawes	622	373–378

Class 4.—Any other Heavy Breed—36 birds competing.

Singles—		
Willow Bend Stud Poultry Farm (Rhode Island Reds)	145	424
A. G. Dawes (Rhode Island Reds)	140	38
A. G. Dawes (Rhode Island Reds)	139	419
Willow Bend Stud Poultry Farm (Rhode Island Reds)	136	429
Trios—		
K. Pennack (Barnevelders)	331	439–441
V. F. Gameau (Rhode Island Reds)	326	433–435
K. Pennack (Barnevelders)	307	436–438
A. G. Dawes (Rhode Island Reds)	299	37–39
Teams—		
K. Pennack (Barnevelders)	638	436–441
V. F. Gameau (Rhode Island Reds)	528	430–435
A. G. Dawes (Rhode Island Reds)	500	37–42

SECTION II.—DRY MASH.

Class 5.—White Leghorns—15 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
A. O. Dawkins	161	449
A. O. Dawkins	149	452
A. O. Dawkins	143	453
Trios—		
A. O. Dawkins	405	448–450
A. O. Dawkins	410	451–453
Willow Bend Stud Poultry Farm	324	454–456
Teams—		
A. O. Dawkins	815	448–453
Willow Bend Stud Poultry Farm	545	454–459

Class 7.—Black Orpingtons—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	144	468
Willow Bend Stud Poultry Farm	130	466
Trios—		
Willow Bend Stud Poultry Farm	353	466–468

Class 8.—Rhode Island Reds—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	117	470
Willow Bend Stud Poultry Farm	114	471

Class 5—*continued.*

	Eggs Laid.	Birds Nos.
Trios—		
Willow Bend Stud Poultry Farm	315	469–471
Willow Bend Stud Poultry Farm	248	472–474
Teams—		
Willow Bend Stud Poultry Farm	563	469–474

SECTION III.—WET MASH.

Class 9.—Any Breed—27 birds competing.
(Home Project Utility Section.)

Name. School. Breed.		
David Hart, Unley High, Black Orpington	165	495
Anthony Rix, Williamstown, White Leghorn	146	478
William Horne, Woodville High, White Leghorn	145	490
Keith Oliver, McLaren Vale, Black Orpington	140	498

Advisory Board of Agriculture.

The monthly meeting of the Advisory Board was held on 30th September, there being present Hon. A. L. McEwin, M.L.C. (Chairman), Messrs. A. M. Dawkins, J. W. Sandford, S. Shepherd, P. J. Baily, R. H. Martin, H. N. Wicks, W. J. Spafford (Director of Agriculture), Dr. A. E. V. Richardson (Director, Waite Institute), and H. C. Pritchard (Secretary). Apologies were received from Messrs. F. Coleman, A. J. Cooke, J. B. Murdoch, and Professor A. J. Perkins.

New Branches.—Approval was given for the formation of Branches at Smithville (Women's) and Blewett Springs, with the following Foundation Members:—Smithville Women's—Mrs. Hodges, Mrs. C. Young, Mesdames D., R., K., and F. Day, Mrs. D. McEwin, Mrs. March, Miss Bird, Mrs. C. Walker, Miss McEwin, Mrs. W. Small, Mrs. S. Pillar, Miss M. Pink, Mrs. D. Pink (sen.), Mrs. D. Pink (jun.). Blewett Springs—Robt. Guthrie, C. G. and J. Dowdell, John Kinnane, H. G., C., and A. Air, T. Elliott, C. Cassitta, J. Franceschina, C. Wait, W. L. Mobsby, Thos. and R. Fowles, S. Dubois, H. Ward, S. and J. Shearing, C. Gregory, B. White, A. T. Howard, E. Brookman, G. Riley.

Conditional approval was also granted for a Branch to be formed at Murraminga (Eyre's Peninsula).

Branches to be Closed.—The Board decided to close the Clanfield, Tarpeena, and Tintinara Branches.

Change of Name of Branch.—The name of the Block E Branch was changed to "Renmark North and Chaffey."

Life Members.—The names of Messrs. W. Slater and C. A. Morgan (Iron Bank), F. E. Waddy (Rosedale), and J. S. Fisher (Gladstone) were added to the roll of Life Members of the Agricultural Bureau.

New Members.—The following new members were enrolled:—Alma—H. W. Brown; Arthurton—J. Westbrook; Auburn Women's—Mrs. Nicholls, Miss L. Maddern, Miss E. Maddern; Balhannah—W. C. Mills, L. Gruhl, E. W. Stevenson, L. Grow, R. D. Jenkins, T. Beviss, W. B. Beviss; Balhannah Women's—Mrs. W. Hicks; Balumbah Women's—Mrs. H. Wohling, Miss V. Wohling, Miss L. Wohling, Mrs. J. Franklin, Miss Ivy Franklin; Barmera—

W. G. Baker, C. M. Ayling, L. Howie, J. B. Cockin, V. B. Wilson, A. G. Snow, C. McRae, J. Murphy, J. W. C. Carnie, N. S. MacKenzie, W. Mudge, H. S. Denman, A. J. Wright, W. Mair, R. M. Simes; Beetaloo Valley—Wm. Greig, Leslie Greig, Alfred G. Head, R. Cornish, Norman Sporn, E. Sporn, W. Wait, L. Wait, Joseph Ryan, W. Andrews, Arthur Symons, Harold Boehm, Stan. Andrews, A. Monaghan; Belvidere—Geo. Cross, E. T. Pallant, Dan. Cross, Jim Cross; Berri—W. N. Ellis, R. Jungfer; Blackheath—S. G. Mudge, Wm. H. Potticary; Black Springs—R. I. Turner; Blackwood—Roy Chapman; Block E—Gilmour Taylor, V. T. McLean, W. Erich Meier, Eric A. Robinson, Chas. J. Chegwidden, Thos. Spurling, L. H. Laffer; Blyth—Keith D. Zweck; Booborowie—W. Kain, K. K. Kain; Booleroo Centre—F. Walladge; Boor's Plains—Cliff. Rodda, P. D. Vidal; Brimpton Lake—L. Kelly, G. Haines, H. H. Schirmer; Buchanan—Jas. Kildea, G. M. Prior, Arthur W. Rohde; Cambrai—N. Harris, J. Harris; Chandada—Leonard Tomney, John Moroney, J. P. Horgan; Chilpuddie Rock—C. Page, A. E. Miller; Clare Women's—Mrs. John Corfield, Mrs. John Hunter; Coonawarra Women's—Mrs. F. Darwent, Mrs. H. Redman; Coonalpyn—R. Bennett, W. Allen, C. Allen, A. Allen; Coonalpyn Women's—Mrs. W. C. Allen, Mrs. Gregory; Currency Creek—H. L. Threadgold; Devlin's Pound—R. J. Stevens, Conrad H. Moon, Thos. D. Jeffries, Ron. W. Treloar, L. R. Burden; Echunga—G. Porteous; Eurelia Women's—Mrs. M. Crowe, Miss P. C. Crowe; Farrell's Flat—R. R. Bartholomaeus; Georgetown Women's—Mrs. J. Phillis, Mrs. D. O'Connell, Mrs. B. J. Myatt, Mrs. E. Lang, Mrs. O. Devlin; Gladstone—J. Stevens, E. Jeffree, W. Nourse, C. O. Bennett; Gladstone Women's—Miss I. Sargent; Goode — R. Paech; Goode Women's—Miss D. Linke; Green Patch—Colin Ritchie; Hanson—H. B. Stockman, Colin McDonald, Don. McDonald, Tom. Warnes, M. R. Humphrys, E. Finch, T. Schultz; Hilltown—R. L. Hilton, B. Willoughby, T. Richardson, T. Somerville, J. K. Somerville, A. Somerville, D. R. Somerville, H. Williams, C. R. Dinham, G. Meyer, F. Dee; Ironbank—W. Sparrow, K. Wescombe; Jamestown—Geo. McGregor; Kangarilla Women's—Mrs. H. Myer, Miss Joy Myer, Mrs. P. Schmidt; Karte—L. Hatcher; Ki Ki—D. Watts, R. Watts; Koolunga—Michael V. Pilkington, Vincent J. Pilkington, Chas. T. Behenna, Clarence W. Longmire; Koolunga Women's—Mrs. A. G. W. Battye, Mrs. C. T. Behenna, Mrs. F. A. Powell, Miss Pilkington, Mrs. Goldsworthy, Mrs. Chalmers; Koppio—H. Gibbs, A. Appleton; Kyancutta—Gordon Strawbridge, John Stoppe; Kybybolite Women's—Mrs. O. W. Corbin, Miss M. M. King, Miss Edna Grosser, Miss Minna Noske, Mrs. S. H. Castine, Mrs. J. H. Ralph, Miss E. M. Kaeding; Lameroo—J. L. Byrne; Laura—N. T. Pech, W. E. Bone; Laura Bay—S. H. Lorimer; Laura Bay Women's—Mrs. D. F. Morrison; Lenswood and Forest Range—Eric Lindstrom, Richard Plummer, Ron. Levrington, Cliff. Green, Wm. Alexander, Allan Filsell; Light's Pass—J. W. Falkenberg, H. W. Nankivell, F. Richardson; Lobethal Women's—Mrs. W. Slade, Mrs. T. W. Lutze; Lone Pine—P. G. Lehrmann, J. Wallent; Lyndoch—Oswald E. Krieg, J. C. Daly; Maltee—Donald Ferguson, R. B. Edson; Maltee Women's—Miss A. Edson, Miss E. Schwarz; McLaren Flat—O. K. Thomas, Bickford Elliott; McLaren Flat Women's—Mrs. G. Ward, Mrs. F. M. Elliott, Mrs. W. C. Cooper; Meadows—E. Paterson; Millicent—A. Kemp, D. S. McCord, Geo. Clark, J. Wilson; Millicent Women's—Miss Elvie Skeer, Mrs. Ken. Johnson; Miltalie—A. M. Wilson; Minnipa—V. E. Kindler; Monarto South—V. Erdmann; Monarto South Women's—Mrs. W. Giles, Mrs. Waterman, Mrs. Angel, Mrs. Collins; Morchard—J. L. Nottle; Morchard Women's—Miss G. M. Halliday; Mount Barker—L. Scarborough, F. Simper, L. B. Nitschke, T. M. Smith, J. W. Walkom, F. Liebelt; Mount Compass—Eric Curnow, Horry Jacobs, J. Kevern; Mount Gambier—H. Meinck; Mudamuckla Women's—Mrs. E. Whyborn, Miss D. Will, Miss S. Robinson; Myponga—E. J. Carmichael, M. Vanborge; Myponga Women's—Miss D. Baxter, Mrs. L. Collins, Miss R. Eatts, Mrs. A. Rowley, Miss V. Rowley; Narridy—A. Siviour, Joe Smith; Narridy Women's—Mrs. S. Darley, Mrs. H. Siviour, Miss R. Sandow, Miss R. Pilkington, Miss K.

Nicolson; Nelshaby—C. F. Walton, C. P. Prest; Owen—G. Gliessert, L. Marshman, O. E. Hancock, G. A. Rapko; Parrakie Women's—Mrs. Geo. Hollis, Mrs. F. W. Gravestocks, Mrs. W. Watts, Miss J. Watts; Paskeville—G. W. C. Meier, Edwin F. Schirmer, Alfred F. G. Bussenschutt, Wm. H. Price, Lawrence R. Price; Penola —F. McMicking, Roy Pollard, Geo. Mepstead, Thos. P. Aitken, Wm. Waugh (jun.), C. H. Carman; Penola Women's—Mrs. Carman, Mrs. P. Read, Mrs. C. J. Williams, Miss Gay Williams; Penwortham—J. W. Jones, T. G. Jones, W. E. Ward; Pinbong —F. J. Davies, J. L. Roe; Pygery—Mortimer J. Daly, Allan Jas. Richards; Rosedale—E. G. Tearles; Saddleworth Women's—Mrs. O. S. Miller, Mrs. E. M. Moyle; Sheoak Log Women's—Mrs. E. A. Lienert, Miss H. Everett; Snowtown Women's—Mrs. E. Hupfield, Mrs. T. E Fryar, Mrs. E. S. Allen, Sister Mudge, Miss J. Marshall; South Kilkerran—W. W. Bittner; Springton—D. F. Miller; Stockport—L. Twigden, C. Clayton, H. E. Howard; Strathalbyn—Fred. Bruns, L. Hender; Strathalbyn Women's—Mrs. S. H. Pearce, Mrs. H. B. Wundersitz, Mrs. H. H. Cross, Mrs. J. Saunders, Miss Wissel, Miss Newman, Miss D. Hassam; Taplan—H. J. Boothey, G. F. Schwerdt; Taplan Women's —Mrs. G. Stewart, Mrs. R. Clarke, Mrs. G. Schwerdt, Miss G. Clarke, Miss N. Condon; Truro—K. Miller; Ungarra—F. D. Butler; Upper Wakefield—E. McDougall, B. Cleary, P. Cleary, Maurice Cleary, J. L. Cleary; Waikerie—P. L. Price, J. Price, L. W. Andrew; Wandearah—Lindsay Inglis; Warcowie — Keith Courtney; Warramboo—D. McKenzie; Warramboo Women's—Mrs. G. Kane, Mrs. J. S. Mitchell; Wasleys—V. W. Day; Wasleys Women's—Mrs. A. Sellick, Miss J. Day; Weavers—Keith Algie; Whitwarta—R. M. Smart, E. S. V. Manley, G. D. Tolmer, S. Sellers, P. C. Saint, M. Williams; Wilkawatt Women's—Mrs. H. H. Brooker; Williamstown—C. D. Oates, E. P. Filsell; Wilmington—P. T. Miller, K. E. Pitt, F. D. Modystach, W. C. Abbott, F. G. Hoskins; Wilmington Women's—Mrs. Walter Zwar, Miss Hettie Gebert, Mrs. Albt. Noll, Mrs. E. T. Harrison, Mrs. E. B. Hayne, Mrs. A. Spaeth, Mrs. Gus. Noll, Mrs. F. Miller, Mrs. J. Edwards, Mrs. Paul Modystach, Mrs. Snowden, Miss Annie Modystach, Miss Evelyn Modystach, Miss Kathleen Modystach; Wirrabara Women's—Mrs. J. Parkyn, Miss - Jaeschke, Miss - Jaeschke, Mrs. J. Hayes, Miss A. M. Wood, Mrs. E. McKenzie, Mrs. Raftery, Miss R. Raftery, Miss C. Hollitt, Miss E. Hicks, Mrs. R. Deer, Mrs. Schneider; Wolseley—Walter W. Merrett, Harold Pierpoint, Jas. Mayes; Yandiah—G. H. Kupke, C. H. Kupke, Leslie S. Keller; Yandiah Women's—Miss M. Kelly, Miss C. Kelly, Miss L. Keller Miss O. Keller; Yeelanna—T. R. Gardner, G. C. Smith, M. G. Best, P. Glover, H. E. Glover, P. J. Campbell.

Bureau Statistics.—No. of branches, 347; No. of members, 5,689.

Several resolutions of Congress and Conferences, &c., were taken in Committee.

At the invitation of the Principal of the Roseworthy Agricultural College the monthly meeting of the Advisory Board of Agriculture was held at the College on 28th October, there being present:—Messrs. F. Coleman (Acting Chairman), A. M. Dawkins, R. H. Martin, Professor Perkins, Professor Richardson, A. J. Cooke, S. Shepherd, P. J. Baily, W. J. Spafford, and H. C. Pritchard (Secretary). Apologies were received from the Hon. A. L. McEwin, M.L.C., J. W. Sandford, H. N. Wicks, Geo. Jeffrey, J. B. Murdoch, and A. J. A. Koch.

Appreciation.—It was decided to forward to Professor Perkins the following resolution of the Alawoona Conference:—"That this Conference desires to convey to Professor Perkins its appreciation of the services rendered by him during his association with the Department of Agriculture, and trusts that he may be spared to enjoy long life in association with good health."

New Branches.—A new Branch was approved for Milang (Women's) with the following Foundation Members:—Mrs. J. McCarthy, Mrs. B. N. Casley, Mrs. H.

Vivian, Mrs. W. Taverner, Mrs. L. Mann, Mrs. C. J. Landseer, Mrs. J. M. Yelland, Mrs. E. A. Whitfield, Mrs. F. W. Dunk, Mrs. E. E. Newell, Miss D. Hassam, Miss R. Whitfield, Miss V. Pearce, Miss E. M. Horton, Miss E. M. Tee, Miss J. Matheson, Miss J. Kelly, Mrs. W. Yates. Conditional approval was given to a Women's Branch at Willowie.

Life Members.—Life membership was conferred on Messrs. J. J. Honner, C. H. Boundy, and F. J. Nation, of Brentwood.

New Members.—The following were approved as new members of Branches:—Auburn Women's—Mrs. Boys, Mrs. Bonython, Mrs. Stevens; Balhannah—Malcolm Wicks, L. Beckwith; Beetaloo Valley—A. Renshaw, J. Head; Black Springs—J. Fisher; Blackwood—W. Colmer; Brentwood—K. McKenzie; Brimpton Lake—J. W. Murch; Clarendon—F. Steer; Coomandook—Edwin I. Tucker, Walter Roehr; Coonawarra Women's—Mrs. H. Munn, Miss Ruth Redman, Miss I. Clayfield, Miss G. Clayfield; Eurelia—M. P. Crowe; Gladstone Women's—Mrs. J. R. Creber, Mrs. A. Millard; Inman Valley—I. S. Anwyl; Jamestown—J. M. Ross, W. A. Ross; Karte Women's—Miss D. Duly; Kelly—J. T. Rodda, A. C. Wake, T. R. O'Connor; Koolunga—Chas. S. Smith; Koolunga Women's—Mrs. Smith, Mrs. Stewart, Mrs. E. T. Bentley; Kybybolite Women's—Mrs. R. H. Shepherd; Lobethal—E. Schoell; Lenswood and Forest Range—W. G. McLaren, B. Hewlett; MacGillivray—F. C. Elsegoode, E. G. Rymill; McLaren Flat Women's—Miss Kathleen Ward; Narridy Women's—Mrs. H. Price, Mrs. J. Janetz, Miss D. O'Shaughnessy, Mrs. A. E. Darley, Mrs. A. Crawford; Penola Women's—Mrs. L. Warner; Penwortham—Andrew Vogt, Samuel Vogt, Frank Vogt, Peter Vogt; Pinkawillinie—Eric Ramsey, Melvin Ramsey; Pygery—H. P. Ingram, A. D. Woodrup, A. G. Copley; Renmark North and Chaffey—L. A. White, Wm. Bellamy, W. E. Mount, Richd. Pollard, R. E. Sowden, Oscar Jungfer, Geo. A. Dangerfield; Sheoak Log Women's—Mrs. L. Heinjus; Smithville Women's—Mrs. J. Lush; Stockport—J. A. C. Nairn; Tantanoola Women's—Mrs. G. Considine, Mrs. C. Burchard, Mrs. E. Kiely, Mrs. R. R. Altschwager, Mrs. L. J. Osborne; Taragoro—Peter W. Henderson; Truro—H. Wilson; Ungarra—W. Treasure, C. B. Tillbrook; Waikerie—L. A. Thompson; Wandearah—V. H. Crouch; Wauraltee—R. G. Newbold, R. J. Newbold, M. Newbold, A. V. Mitchell, Thos. D. Mitchell, Wm. Glacken, A. W. Kelly, L. S. S. Andrew, G. Titley, A. F. Robertson, F. H. Tonkin, D. Tonkin, L. K. Tonkin, S. King, C. Lovelock, H. L. Chambers, J. Dollard, G. Neindorf, J. T. McMahon, L. Brown; Whitwarta—E. L. Noble, S. R. Angel; Wilmington Women's—Mrs. F. Low, Mrs. B. Modystach, Mrs. B. Spaeth, Mrs. Colin Carter; Wirrabara Women's—Miss M. Deer, Mrs. G. Torr, Mrs. A. M. Mahood, Mrs. C. Zwar, Mrs. Rzeszkowski, Miss Rzeszkowski, Mrs. Dack; Wirrilla—D. Evans, G. Blatchford, H. O. Kench, W. Reggitt, A. B. Humphrys; Wudinna—Duncan Duguid, F. Shedley, J. Castles, L. Wiles, S. H. Knight, J. Milner, E. Rashleigh; Yundi—E. M. Griffiths, E. D. Rehn, E. Chaplin.

Consideration was given to several items referred to the Board by Conference.

The Evolution of the Australian Merino.

The Library of the Department of Agriculture acknowledges the receipt of a volume "The Evolution of the Australian Merino," by E. W. Cox. The book has been written with the object of showing how the Australian Merino of to-day has been developed. The histories of the great studs of Australia are given, and valuable information in the chapters devoted to breeding, has been gleaned from the great studmasters and geneticists.

The book is published by Messrs. Angus and Robertson of Castlereagh Street, Sydney. Price 21s.

Papers Read at Conferences

Ensilage on a Mallee Farm

[J. B. BURNETT, Caliph (Murray Lands East Conference).]

The writer of this paper, in common with many others, has been much concerned with the lack of green feed in this district during summer and autumn. This shortage of green feed is particularly hard on the few dairy cattle, pigs and poultry which we carry. Of course, sheep and horses should come under this heading, but, for the purpose of this paper, it is proposed to disregard the last two items of stock, for the reason that they did not come within the scope of the operations carried out in the particular year with which this paper deals. Irrigation of any sort of green fodder seemed out of the question with bore water, so it was decided to try out on a small scale the making of a quantity of ensilage.

A previous experience in New South Wales in the making of ensilage, coupled with the assurance of the District Adviser (Mr. Griffiths) that the effort was more than worth while, plus a close study of Bulletin 274, "Manufacture and Utilisation of Ensilage," prepared by Mr. W. J. Spafford (Director of Agriculture), issued by the Department of Agriculture, put me in a sufficiently optimistic frame of mind to make the attempt.

The method of ensiling fodder comes under 3 headings:—(1) Overhead silo; (2) stack; and (3) pit; and the result of experience over some years is that the silo can be ruled out at once on the score of expense. Very few mallee farmers are in the position to stand up to the heavy expense involved in building a silo.

Pit Silage

No. 2 (the stack method) is wasteful; it requires much more labour and plant, and as expense must be kept down, the stack must also be disregarded.

No. 3 (the pit or trench method) has proved the most satisfactory and cheapest way to handle ensilage in this district, and was adopted, and is still used on our holding.

The pit used was originally a cellar. Cleaned out and enlarged, it measured 18ft. x 18ft. 6in., giving a capacity of 17 tons of ensilage—sufficiently large for any farmer for a first attempt.

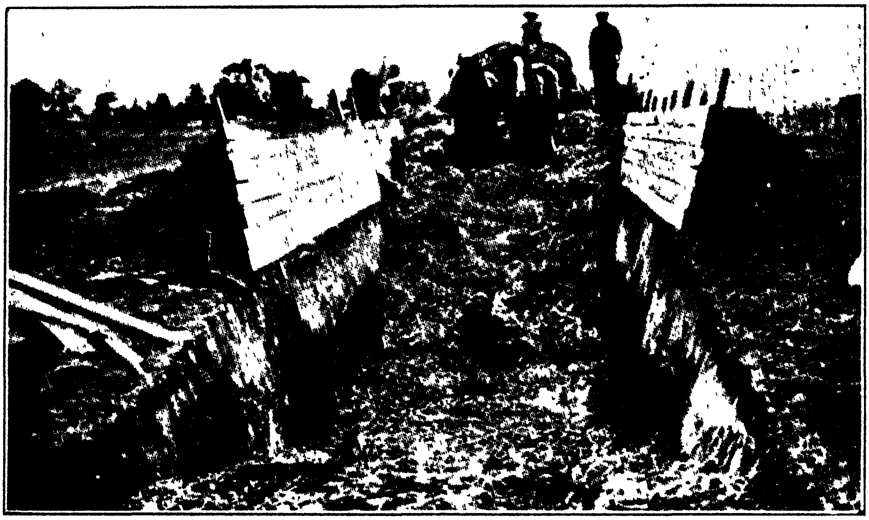
To minimise the risk of failure, it was decided to chaff the material into the pit.

This method proved well worth while, as the chaffed ensilage was much easier to tramp down and better to handle when it was later required for use. The chaffcutter was installed on the end of the pit.

The required labour was secured by enlisting the aid of a sympathetic neighbour and his man. A portion of a crop of 4½ acres of Nabawa wheat, which later yielded 15bush. of grain, was marked out. With binder and wagon ready, the stage was set for operations to commence. The practice followed was for the binder to cut until sufficient material was down to give 2 loads of green stuff, each load about 3ft. high on a 13ft. x 7ft. wagon floor. As soon as this amount was cut by the binder, all hands got to work on the cutter, chaffed the green material into the pit, and tramped it down without further delay. No cut sheaves were left lying in the paddock. No material was left on hand unchaffed overnight, and particular attention was paid to tramping the green mass.

Two days were occupied in filling the pit, and on the evening of the third day a further run was made, and the chaffed material was well heaped up in a mound, and the whole mass covered with about 18in. of earth. No attempt was made to regulate the temperature, the writer being prepared to let that phase of the operation adjust itself. No difficulty was experienced in running the green material through the cutter. The work was easy on the knives, and petrol consumption was about 3galls. for the whole operation. The heaviest work is loading the green stuff on the wagon, and as a result, a considerable loss of enthusiasm was noticed by the end of the day amongst the people responsible for that part of the job.

The pit was not opened until 1st March the following year, about 3½ months later, when the need for feed for cattle became most pressing. A section of earth was removed from right across the pit, and the ensilage taken out to the depth of the pit in a slice about 2ft. wide. This left a small surface exposed, and that method of taking out the ensilage persisted until the whole of it was used up.


Filling a Silo Trench

Not one scrap of the ensilage in this pit was wasted. Even the seal of mould across the top and around the sides was keenly relished by dry stock, and was eaten to the last ounce.

In this year we are milking 5 cows, and these animals were at once put on a ration of 25lbs. ensilage, ½ tin cocky chaff, and 1lb. crushed grain and bran. The result of feeding this mixture was amazing in comparison with dry feed, and the resultant produce at once assumed the colour and flavour associated with springtime, with its wealth of green pasture. Unfortunately, no record is available of the increase in production under the improved feeding conditions. A ration of ensilage was given to pigs at the rate of ½ kerosene tin daily to a sow and a litter of 10, while baconers had as much as they could eat. The poultry had free access to the ensilage pit, with considerable benefit to themselves, until they were driven out.

This paper is a plain statement of an effort to conserve fodder to carry over the dry part of the year, and from the results obtained, the writer is satisfied that ensilage conserved on a larger scale than described here will enable farmers to maintain a stock-carrying capacity considerably in excess of numbers now carried.

It will enable the sheep man to carry his flock through the lean months of autumn after the stubbles are exhausted. It will maintain a regular milk supply throughout the year, and thus increase the pig carrying capacity. Once reserves of fodder of this nature are built up it should go a long way towards solving many of the problems which now harass the mallee farmer.

Sub-dividing the Holding—Its Relation to Stock Raising

[O. J. Murphy (Warramboo), Minnipa Conference.]

Although the current price of wheat is higher than for several years, it would appear likely that at the end of the year many farmers will find that the sheep flock has been more profitable than the wheat crop. Two points stand out clearly—firstly, that we must, as far as is practicable, restrict the growing of wheat to fallowed land. The second point is that stock raising is of no less importance than wheat growing. The writer does not contend that wheat growing should be entirely abandoned in favour of stock raising. It is only by the systematic cultivation of the soil, the destruction of mallee shoots and stumps, and the regular application of superphosphates, that we can obtain the growth of feed essential for the raising of stock.

But the main object of this paper is to suggest means by which we may gradually increase the stock carrying capacity of our farms without seriously curtailing the cereal production. Recent extensions of the Tod River water service have enabled more farmers to turn their attention to sheep. The initial expenses for the beginners are heavy. Water, of course is essential, and sheep-proof fences must be erected.

Water pipes should be laid under the surface of the ground. If placed on the surface, the water will become too hot during the summer months for use as drinking water or for garden purposes during the daytime; and in the winter months, the freezing of the water in pipes on the surface is bound to cause split pipes and leakages.

Fences.

The beginner should adopt a plan of fencing with the ultimate object of having a number of small paddocks. Experience has shown that more sheep can be carried on a given area subdivided into small paddocks. Barley grass is our chief native grass. It grows prolifically on well-supered ground. Kept fed down during August and September, this grass will remain green several weeks longer than if allowed to grow unchecked.

As it is seldom possible for the beginner to subdivide his holding into small paddocks at the outset, it is suggested that 6-line Cyclone fencing material in 5 or 10 chain rolls be used. This class of fencing material strained tightly on posts 7 yards apart with a protecting barb on top provides a safe fence for big and small stock. As a temporary sheep proof fence, it may be hung on posts up to 1 chain apart. It has the distinct advantage that it can be quickly rolled up and moved to another fencing line. It is well worth while to subdivide a paddock of 300 or 400 acres, even though it may entail moving the fencing material once or twice during the year. It will mean a better percentage of lambs and better conditioned stock.

In regard to permanent fences, the writer recommends the use of netting on boundary fences. A well constructed netted fence is 100 per cent. sheep-proof, and of great value in the control of vermin. The cheapest division fence so far as material is concerned is the plain wire fence. Not less than 6 wires, including the top barb should be used with posts not more than 5 yards apart. Where native timber (of which Ti tree is probably the best) is available, droppers are not necessary. If posts are scarce or stony land is encountered, posts 15 yards apart with four intervening droppers make a satisfactory fence. Mallee sticks 1½in. to 2in. in diameter make a good substitute for iron droppers, but the former should stand on the bottom wire of the fence, not in contact with the ground. For reasons stated previously, Cyclone sheep fencing has much to commend it.

Crops for Grazing.

The most difficult period of the season for keeping stock in good condition is the autumn. The beginner on comparatively new country should be well advised to set aside for hand feeding oats or barley. Failing this, he should shut up a stubble paddock—preferably an oaten or barley stubble—when it is harvested, and retain it for sheep during March and April.

Once the farm is subdivided into comparatively small paddocks, the opportunities to grow crops exclusively for grazing increase. Wimmera Rye grass appears likely to become popular. There is no doubt as to its attractiveness to stock. Lucerne has been grown in small areas with some success, but it would appear that there is much to be learnt in respect to the successful growing of this valuable fodder in our districts. Peas have given good results in experimental plots. This crop could be grown more extensively with advantage. The White Brunswick variety is recommended. It grows particularly well on the slopes of sand rises, and it does not require the same care in sowing as the minute seeds of lucerne and rye grass. Sheep will harvest the pea crop with a minimum of waste. It forms a fattening food, and in addition, is a valuable soil improver. The big paddock is one of the chief reasons why grazing crops are not grown more extensively. Whereas the farmer would hesitate to sow 300 or 400 acres to peas or rye grass, he would more readily make the experiment over an area of say 50 to 100 acres.

Grassland v. Fallow

[N. CHILMAN (Warramboo), Minnipa Conference.]

In the first place, with grassland we get six months good feed for sheep, the value of which is hard to estimate. We are going to have better wool with sheep running on grassland than on fallow, as they do not collect nearly as much dirt in the wool. Then the sheep droppings improve the ground, and the tramping of sheep packs the soil. If we can get a burn over the paddock early in February, most grassland will plough up dry. That gives all the weeds a chance to germinate with the first rains, and the ground is then in good condition for working back for seeding. The ground can easily be worked back with a cultivator or combine, and a couple of harrowings will make a good seed bed. There is no difficulty in killing weeds on land worked in this manner. Should we get an early rain, the grassland can be worked up wet; but I prefer to harrow it then before working back with the combine. Another advantage is that the horses get a spell when the green feed is at its best. Green feed is a good tonic for horses and helps them to keep in good condition for the rest of the year. Instead of having to have good stable feed and keep them working in the wet weather and heavy fallowing, they are living out in the paddock and we have a chance to get the odd jobs done before harvest and are not delayed when seeding starts.

With fallow.—After our horses have had a heavy seeding and are needing a spell on green feed, instead of being turned out they are yoked up to a fallowing plough and are working in all sorts of weather. Rain or shine, frost or wind, the fallowing plough must be kept going, as all fallowing should be finished by the end of August. After that date we are only wasting time and feed for no better returns. Early fallow as a rule grows a fair amount of rubbish, and the teams have to be kept going to kill it; otherwise sheep must be run on the fallow, thus getting the wool full of dirt. Summing up—

With grass land treated in the above manner, we obtain an extra six months good grazing, our horses have a spell in the wet boggy weather, and we get our odd jobs done.

With fallow our horses have got to go into heavy work just as they have finished the seeding, and our odd jobs wait till after harvest.

Which is going to pay the better? Up to date I have had just as good results from grass land as from winter fallow.

Disposing of the Apricot Crop

[F. W. AHRENS (Light's Pass), Greenock Conference.]

The demand for either fresh or dried apricots is never constant, but fluctuates with the seasonal conditions in other fruit producing countries and with the quality and quantity of fruit available. Heavy or light crops in other varieties of fruit may also have a decided influence on the disposal of the apricot crop. For instance, a light crop of peaches may have a stimulating effect on the apricot canning industry. Another important factor which must be taken into consideration is the distance from the orchard to the factory or railway, and the kind of roads which have to be traversed. When fruit has to be transported four or five miles over rough roads, cartage becomes quite a considerable item; also the quality of the fruit is not improved for canning purposes. A price for fresh fruit which may be quite satisfactory to a grower living close to the factory or depot may not be so to a man living several miles away.

A grower should not change about more than he can help. A man who has been in the habit of drying his apricots for a number of years should not rush into the canning business for one year because he thinks he can make a few extra shillings, nor should the man who has been specialising in the production of canning fruit desert his particular line on the slightest provocation. There are tricks in every trade, and it is better for fruitgrowers to specialise in one or two lines than to try all of them and make a failure all round.

Continuity of supply on the world's market is another matter which must not be overlooked, and although either drying or canning the greater portion of the crop may show a slight monetary gain in any one particular season, this may be more than offset by loss of markets in future years. From a purely personal point of view, selling fresh is the best method of disposing of the apricot, but here the size of one's family must be taken into consideration. The man who has to have all the cutting done by hired labour would probably do better in most years by selling fresh, whereas the man with the large family would be well advised to dry.

Every grower should, in deciding this question, not view it from a purely local point of view, but try and visualise the industry over a number of years, and then act in the direction which he thinks will be of greatest benefit to the industry; for, after all, what is best for the industry as a whole is best for the individual grower in the long run.

Dairying as applied to the Sale of Cream to Factories—The Frozen Whole-Egg Industry

[H. C. Brice, Yeelanna Conference.]

Obviously, the first consideration is the breed of the animal, and the continuous improvement of that breed. It is difficult to recommend a breed, because certain breeds will do well in one district and be quite unprofitable in another; consequently each district must be its own judge of the breed must suitable to it. During the last few years of low prices for wheat farmers have realised the advantage of mixed farming. Those who rely solely on cows for their means of livelihood mostly concentrate on Channel Island breeds, the chief of which is the Jersey, whereas where fresh milk markets are available the choice is often between the Friesian and Ayrshire. A further consideration is, where profitable, the value of the steers as meat, and for dual purposes the choice would probably be between the two latter and the Milking Shorthorn or Red Poll. By using only pedigreed bulls, true to type and with big butterfat records behind them, a farmer can soon establish a good herd of profitable cows.

I have heard many expressions of satisfaction from cross-breeding, and while not condemning the practice altogether, it is well to remember that, although the desired object may be achieved in the first progeny from the crossing, conflicting influences do not long submit to compromise. A struggle between the breeds for mastery ensues, and the result in succeeding generations from half-blood animals interbreeding is variations from the character of animals bred immediately from the first cross, and usually the reversion tends to the worst qualities of the breeds and the destruction of all that was good in either side. It is quite wrong to consider that no permanent good comes from a cross, because, with scientific weeding out, it is possible to create a new breed. Still the chances are against the average mixed farmer achieving these results.

Having decided on the breed, and the future progeny, the next consideration is to obtain the maximum results without unnecessary labour; and I will divide the means under the following three major headings:—

1. Feeding and housing.
2. Cleanliness.
3. Marketing.

I have included feeding and housing together, because butterfat is only produced from the surplus blood made from food the cow consumes, which is not required for her bodily necessity and warmth. From this it can be easily deduced that a cow, with no shelter from cold, bleak winds, will not give the same results as a similar cow which has good protection from the elements. Many expert dairymen even go so far as to rug regularly the cows during the cold weather, and are quite satisfied that it has been to their financial advantage. A good clean straw stack in the paddock is invaluable, because it affords protection and warmth from all directions.

Animals, like human beings, do not all require the same amount of food, and a quantity which will fatten one may half-starve another; therefore, the food should be varied according to the yield of milk. Quite a quantity of the food eaten is non-milk-producing, and it is only that portion of dry matter which can be digested by the juices of the stomach and intestines and absorbed into the system which is valuable as food. This does not include *all* the dry matter she eats, because a fair proportion is indigestible. The digestible portion consists of three important classes, known as proteids, fats and carbohydrates. Proteids are the most valuable, because they alone contain nitrogen, and this is essential to all living things. Lucerne, peas, and clovers are plants containing high proportion of proteids. Carbohydrates are plentiful in maize, oats, wheat and general grasses. Fats are plentiful in linseed and other grain. Meggitt's linseed meal is very rich in proteids and fats, and is highly recommended as an addition to all animal rations, and its use has proved highly profitable to stockowners.

A balanced ration is the most essential part of feeding, and should contain proteids, carbohydrates, and fats in sufficient quantities and in the right proportions, and also with sufficient quantities of bulk and moisture, so that the animal can extract the various substances from the food to supply her needs. Most green pasture is the best food, because nature has attended to this; still, general grasses are not in the correct ratio, and the shortages should be made up. Lucerne, maize, and clovers contain about six parts carbohydrates to one of protein, and although not a balanced ration exactly, they are about the closest to it.

Most Australian grasses are rich in carbohydrates, but poor in protein, and as carbohydrates will produce bodily fat and energy, but not butterfat, a substance rich in protein, such as linseed, should be fed as an addition. A small quantity of Dicalcic is also advisable, as it assists in the general health, aids milk production, and is a preventive against disease such as "Dry Bible." Having obtained the desired—or as near as possible to it—result in production, it is advisable to use every means to obtain the highest possible value for the product, and hence the following heading.

Cleanliness.

Butter factory machinery has progressed considerably in recent years, and it is now possible to manufacture from mixed cream a much higher and better keeping article than was the case a few years ago; but with tainted cream from almost any cause controllable by man, this machinery is still incapable of surmounting the faults to anything approaching complete elimination. I am including in this heading quite a number of faults which are more the results of thoughtlessness and lack of knowledge, rather than unclean habits, but they all have similar effects in the production of a second-grade butter, and thus reduce the value of the cheque received.

The faults can be listed under the following headings:—

1. Rusty or worn tinware, such as separator parts, milk buckets, strainers, and particularly the cream cans. This fault causes chemical damage to the cream which no machinery can eradicate, and is responsible for metallic and fishy tastes in butter.

2. Cream from cows freshly calved being mixed with good cream. This causes albuminous decomposition and tainted butter.

3. Cream separated with too high a fat content, such as 55 per cent. to 60 per cent. and over. This cream does not contain sufficient serum and solids—not fat—to withstand the natural conditions, and is largely responsible for tallowy butter. A fat content of from 42 per cent. to 48 per cent. is recommended, with 45 per cent. as ideal.

4. Keeping the cream too long on the farm with a resultant stale and cheesy butter.

5. Allowing the cream to absorb odours such as closeness, meat, fruit, or odours from cowsheds, engine room, &c.

6. Strongly flavoured weeds. This can be somewhat relieved by removing the cattle from the paddocks about 2 hours before milking, and also aerating and promptly cooling the cream or milk.

7. Mixing hot cream with cold cream. This largely causes early fermentation, particularly during the summer months.

8. Including the foremilk with the whole of the milk. The first few pulls from each teat should be milked into a separate vessel and destroyed, because it is mostly teeming with harmful bacteria and contains very little butterfat.

9. Insanitary methods such as dirty cowsheds, milkers' hands and clothes, separator being only washed once daily, improper washing of milking utensils, cream left exposed to flies, &c., and the numerous other faults which are attributed to the person who simply will not trouble to take proper care of anything.

It is unfortunately a fact, too, that it is from cream of this class that, when a second-grade certificate is issued, a factory receives most complaints of unjust treatment. There are, perhaps, several more particular causes of second-grade prices, but most of them can be fitted to the general headings as outlined.

Marketing.

It is most unprofitable to take proper care of the cream on the farm and then have it unnecessarily damaged in transit. The colder the cream the less liable it is be contaminated in transit from the goods with which it comes in contact. Cream should be marketed as soon as possible after separation, and not be unnecessarily delayed at the station or on the road. In warm to hot weather good results are being attained by placing a damp bag around the can while in transit, and although on many occasions the bag will become dry prior to arrival at the creamery, the contents are nearly always cold.

A can may be kept cool while in the producer's possession, but when placed inside a conveyance it may be surrounded by other hot cans, and without some protection would soon be damaged, particularly is this the case with rich cream.

I would particularly impress the advisability of regularly having cows tested for butterfat: a service which many factories will gladly render free of cost, and thus help to cull out unproductive animals.

The Frozen Whole Egg Industry.

The Frozen Whole Egg Industry is generally referred to as "The Egg Pulping Industry," but as the word "pulp" is usually associated with a class of goods of a low order, and as the eggs suitable to manufacture into Frozen Whole Eggs must be good in order to produce a product suitable to compete in the open markets of the world, it is not used. That such an article is manufactured here is demonstrated by the ready sale each year in England.

To some minds this industry is a comparatively new one, but that is not the case. For over a quarter of a century this has been an important section of business, and has been the means of successfully handling the South Australian spring production of eggs. During the last 10 years, production of eggs all over Australia has increased, and new markets had to be found. A market, like many others, was found in England, but to hold that market it was essential that only the very best should be exported in the shell. Packing and grading floors were established, and only those eggs which were very fresh, spotlessly clean, evenly shaped, and weighing from 1⅞ozs. and upwards, were eligible to be exported in the shell, so that Australia could favourably compete with Irish and Continental supplies, which were more favourably, geographically, situated for the London market. The justification for strict supervision for exportation is clearly demonstrated in the expansion that has been possible in Australian exports.

Eggs not suitable for the chilled egg trade have to meet a different competition, *i.e.* to compete with low cost of production exports from China; consequently, although an egg may be only one day too stale for exportation in shell, it immediately loses value to the extent of 5d. to 6d. per dozen.

Eyre's Peninsula, owing to its distance from the packing floors, has been unable to obtain the higher prices, and the very heavy losses from breakage in the ship's slings, numerous handlings, improper packing and high cost of freight, have mostly resulted in a loss on their production cost to her farmers.

The establishment of the Frozen Whole Egg Industry in Port Lincoln will eliminate considerable waste, expenses in transit, loss in evaporation of the eggs, and expensive freight on bad and smashed eggs. This saving is passed on to the producers, and it is fully anticipated that, provided sufficient support is forthcoming to keep the plant working at reasonable pressure, values will be maintained, which will turn poultry raising on Eyre's Peninsula into profitable levels, and thus stimulate production to such an extent that it will only be a short period before there are sufficient supplies available to establish export grading and packing floors in Port Lincoln for direct shipment of chilled eggs overseas.

The successful issue of this innovation depends on the quantity handled and the promptness of the receipt of the eggs after they have been laid.

Costs of Production and Land Values in the Mallee Areas over 2o years

[T. H. Vowles (Wanbi), Alawoona Conference.]

To get precise costing is problematical, since evidence is determined by the varying standards of the operator, his equipments, soils and seasonal conditions requiring more or less working of the fallows, &c., but after going through an ocean of figures and having in mind three or four fair farms in the district, a suitable formula appears to be to take 5 per cent. of the capital involved in a property of say 1,500 acres, with a plant requisite to crop 300 to wheat and 300 to oats per annum in a 5 year rotation(wheat, oats, 2 years grazing, fallow) and, as generally happens in most seasons to have half the 300 of oats rough fallow or worked up stubble after summer rains. Further, to simplify the apportioning ratio of costs of cereal production to sheep account, one deems the benefit of sheep, in reducing costs of cereal production, sufficient to cover the interest on outlay to accommodate the sheep in water facilities, fencing, &c.

Moreover, embracing an average farmer's family of 5 children, not yet reached the working age, with a home of reasonable comforts, with living conditions, not at all in ratio to the heaviness of the work entailed or its importance to the solvency of the State, but gauged on existing conditions, a trifle above the basic wage, this being the minimum to sustain life. This latter state is made possible only by the credit that has been made available from banks and financial institutions. This is significant when a profession relies for its existence on terms of "extended credit."

The position has now arisen by the events of the last 10 years of this "elasticity of credit" being stretched to limits of liabilities exceeding the equity in the land, which has and will continue to have, a marked effect on the increased costs of production in the future.

Area and Livestock.

This farm is approximately 1,500 acres, being 100 chains by 150 chains, having economy in fencing; and after 10 years of clearing of scrub is cut in 10 paddocks of 150 acres, with no set race, which must be avoided in drifting country, but having a race fashioned through one of the centre paddocks with 1 mile of Cyclone fencing always on hand for such a purpose to suit cropping; and in some years a whole paddock may serve as a race.

The farm is equipped to carry 12 horses, 200 ewes, 100 wethers, 4 milking cows, 8 pigs, 150 fowls. The ewes' average over the last 20 years is about 50 per cent. lambs. The size of the general flock would vary from 500 in say 1925 to 100 in 1930. "Wools" would average about 9s. per head net, lambs approximately 10s. net, with about 5 per cent. deaths in the whole flock. The pigs as a side-line are needed for waste milk, since it does not pay to produce baconers at 3 guineas, with wheat at 4s. per bushel; likewise fowls for waste feed about the farm. The cows are fed for a few months of the year with linseed nuts and chaff to keep them up to production standard until pastures are available.

TABLE I.

Cost of Production.

Fifteen hundred acres of scrub land taking 10 years to clear.

	s.	d.		
Rolling	6	0	per acre	
Spring backs	1	6	per acre	
Snagging	1	6	per acre	
Shoots, five years	5	0	per acre	
Stumps, five years	6	0	per acre	
	20	0	per acre = £1,500 @ 5%	£75 0 0

TABLE I.—*continued.*

FENCING.

Ten paddocks of Cycloñe and barb, with one mile of Cyclone on hand for race purposes with eight Cyclone gates. Including £36 for repairs, replacements	= £500 @ 5%	£25 0 0
Two bores 250ft. deep, mill, &c.	= £500 @ 5%	£25 0 0
House and sheds	= £600 @ 5%	£30 0 0

PLANT.

Engine and chaff cutter	£85
Plow, seven furrow fallowing	90
Cultivator, 19 tyne	90
Combine, 20 tyne	90
Ten foot stripper	170
Ten foot harvester	220
Ten set harrows	30
Fire rake	25
Trolly	80
Dray	20
Motor Car	300
Twelve horses @ £25	300
Twelve collars and hames	30
	£1,530 = £1,530 @ 5% £76 10 0

Crown lease instalment	£35 0 0	
District council rates and land tax	12 0 0	
Super for 300 wheat, 200 oats	100 0 0	
Labour £2 per week (no allowance being made for wages for farmer himself)	110 0 0	
Cornsacks	68 0 0	
Grading	5 0 0	
Repairs to combine and shares £5; plough £3; cultivator £1 10s.; collars £1 16s.	11 6 0	
Sustenance, family five children	100 0 0	
Repairs to windmill	5 0 0	
Clothing, house linen, replacements, &c.	50 0 0	
Doctor, dentist	10 0 0	
Petrol and oil for chaff cutting, machinery, upkeep of car (general repairs not itemised)	62 0 0	
		£568 6 0
Grand Total		£799 16 0

TABLE II.

TOTAL RETURNS.

Average wheat yield for 20 years. Eight bushels at 4s. 1d. = £1 12s. 8d. per acre on 300 acres			£480 5 0	
Less 100 bags for seed			61 5 0	
				£419 0 0
Average oat yield for 20 years. 12 bushels at 1s.			£180 0 0	
Less 100 bags for seed		£15 0 0		
Less 300 bags for feed		£45 0 0		
			£60 0 0	
				120 0 0
				£539 0 0
Wool from 300 sheep averaged 9s. per head net		£135 0 0		
Lambs 50% = 100 lambs at 10s.		£50 0 0		
		£185 0 0		
Three hundred sheep at 15s. = £225 at 5% (200 ewes, 100 wethers)	£12 5 0			
Five per cent. deaths at 15s.	11 5 0			
		£23 10 0		
For 10 years total returns (less deductions)		£161 10 0		
Spread over 20 years, profit			£80 15 0	

TABLE II.—*continued.*

Carried Forward			£80 15 0	£539 0 0
Cows.				
Four milkers averaging 2½ cows producing whole year at £2 8s. per month		£28 16 0		
Four milkers at £7 = £28 at 5%	£1 8 0			
One pound for separator 20 years	1 0 0			
		£2 8 0		
		£26 8 0		
Pigs.				
Eight pigs to use up waste milk disposed of at £3		£24 0 0		
Fowls.				
One hundred and fifty fed on waste produce, averaged five dozen eggs week at 9d.		£9 15 0		
			£60 3 0	
				£140 18 0
Total returns				£679 18 0
Annual loss				£119 18 0

Table showing costs of production	£799 16 0	
Wheat at 4s., oats at 1s. show returns of £539, being a loss of £345.	£539 0 0	
Returns from sheep show profit of £161 10s. in 10 years	£80 15 0	in 20 years.
Returns from eight pigs show profit of	24 0 0	
Returns from four cows show profit of—(less £1 separator)	26 8 0	
Returns from 150 fowls show profit of	9 15 0	
Total returns	679 18 0	
Annual loss on whole venture	119 18 0	
Total loss for period of 20 years	£2,398 0 0	

NOTE.—The first 10 years carried no sheep and profit of second 10 years are spread over the whole period.

It will be seen by Tables 1 and 2 that the total capital involved, irrespective of the first £1,500 used to clear the property, is approximately £4,000, which, in ordinary investment at 5 per cent., would earn £200 per annum.

Land Values.

Land has two values, productive value (which is real value) and market value (what it will sell for). In a general way the value of land is what it will sell for, but what it will sell for is gauged largely by what it will produce; but the merits of what it will produce are gauged very considerably as to whether it is situated within or outside of Goyder's line of rainfall. Generally speaking, within Goyder's line is a safety valve to land value deflation; outside, there appears no limit to which values can fall. Hence, to get a unit of value from the above property we must assess the improvements thereon, which is approximately £3,000, or £2 1s. 4d. per acre. But the Crown value is assessed at 10s. per acre in its virgin state (despite the fact that *aggregate sales* have shown this "Crown" value non-existent), making £2 11s. 4d. But the question arises, "What is land worth that shows a loss on production over 20 years? Further, can it gain value over the next 20 years should prices rise to 6s. 6d. per bushel, having already a dead-weight burden of £2,400, plus a Crown burden (equivalent to a further £700 overdraft), carrying in all £155 annual interest bill?

Eradication of Convolvulus—Experience at Muscatel Vineyards at Marion

[J. AUSTIN LAMBERT (Blackwood), Greenock Conference.]

Though probably native originally to Europe, convolvulus is well known as an introduced weed in many countries of the world. It has shown itself to be a particularly troublesome pest in the United States of America, as well as in many parts of Australia.

As far as I have been able to ascertain, the plant was first observed on the property at Marion during the late nineties of last century. Its spread during recent years was so very rapid that eradication measures became almost imperative. Where convolvulus has been allowed to establish itself on any part of a holding, it will spread to other parts unless very great care is exercised. Despite the precautions taken by us to limit to a minimum the propagation of this weed, quite a number of new patches appeared and gained a firm hold in various parts of the orchard as the result of ploughing operations and irrigation The spread of the weed is brought about both by carrying fragments of the root system to clean areas by the plough or other implements during winter or early spring, and by the distribution of seed by flood or irrigation water. Personally, I do not think there is much danger of spreading convolvulus by cultivation during the hot, dry conditions of summer and early autumn. During winter and spring, however, when there is usually sufficient moisture in the soil to induce fragments of the weed to grow, cultivation is extremely likely to spread the weed to new situations. Though the seed of convolvulus can doubtless be spread in a number of ways, flood and irrigation water is probably the most effective agent in this respect.

The first attempt to check the spread of convolvulous on this property was made in 1930. An isolated patch approximately 3ft. by 4ft. in area was dug out with pick and shovel. Digging to a depth of 18in. and putting all the soil through a ¼in. mesh sieve, all visible particles of weed were collected and burnt; the hole was then filled in. When we started spraying in 1933 this particular patch had spread to about 14ft. by 10ft. in area.

Owing to the disconnected nature of the affected areas, it is difficult to give an accurate estimate of the total acreage occupied by the weed, but about 2½ acres had to be treated. The vitality of convolvulus is astounding. For several years past the bed of the Sturt Creek adjoining this property has been encroached upon by the weed, and after water had ceased to flow, usually in October or November, succulent growth rapidly appeared and flourished. On the old, well-established areas, covering some 2 acres, its growth was most vigorous. Where it could avail itself of a tree trunk as a support, it would entwine itself and reach a height of 3ft. to 4ft.; elsewhere it formed a dense mat, in many places quite 1ft. thick.

To-day an odd, sickly plant, and occasionally some seedlings, are all that can be found of this once flourishing perennial weed. Its eradication has been brought about by the repeated applications of sodium chlorate. This substance, used in the form of a 10 per cent. solution, made by dissolving 1lb. of the chlorate to each gallon of water, was applied as a spray each year over a period of 3 years, and although further vigilance will be necessary for a year or two to come, chiefly because of seed germination, we feel we have achieved the task we set out to accomplish.

Briefly, the applications of weedicide during the three seasons were as follows:—

First year, 1933-34:—

Application 1—320galls. during second week in November.

Application 2—310galls. during first week in January.

Application 3—240galls. during fourth week in February.

Second Year, 1934-35:—

Application 1—130galls.

Application 2—80galls.

Application 3—25galls.

Dates approximate those of previous year.

Third Year, 1935-36:—

Application 1—16galls. during first week of December.

Application 2—9galls. during second week of February.

Application 3—4galls. during first week of April.

Application 4—¾gall. during second week of May.

As has been indicated, these affected areas were ploughed each year, and in 1933 this was done late in August. Subsequently the ground was worked down to a good tilth with disc harrows and then rolled. No further cultivation or irrigation was applied for that season. We had received advice that applications of 1cwt. of chlorate (*i.e.*, 112galls. of spray) to the acre would be reasonably heavy. It will be noted that both the first and second applications exceeded by a good deal that amount. This was necessitated by the density of growth and the desire to wet as much of the foliage as possible

Before the third application was made one very noticeable fact became evident. On headlands and other areas where the soil had not been broken up the effect of the weedicide was much more definite than on areas which had been cultivated. In view of this, it was decided to suspend ploughing operations on convolvulus areas until such time as we considered the weed to be definitely under control. The only cultural operation carried out during the following year, therefore, was to use the disc-harrows lightly in September to clean off winter vegetation.

Again, the only moisture received during the second year was natural rainfall, all irrigation being withheld. A point of interest noted during that season was that the established fruit trees continued to bear heavy crops of fruit of excellent quality, much of it being superior to similar varieties in other parts of the orchard, where full irrigation and cultural practices were carried out unhindered. Other noticeable features were the rapidly disappearing density of growth, and the sickly, pallid appearance of most of the plants, which still strived to grow. During the second spraying operation of that season I noticed quite a number of seedlings, the first seen since the commencement of the treatment. Ability to recognise these seedlings has since stood me in good stead, for on five occasions I have observed and destroyed one or more or these during my routine duties in parts of the orchard hitherto not affected by convolvulus.

By the end of the second season the surviving plants were mostly scattered and sickly. The convolvulus being reduced to this extent, it was decided to again plough the areas. Accordingly, in September, 1935, all ground, after being irrigated, was ploughed and well worked later with disc-harrows. Other than the plough, the disc is the only implement used on these areas for quite a number of years, for the reason that it does not tend to drag fragments of weed from place to place—not, at least, to the extent that cultivators, harrows, etc., do. Our hopes that this tilling of the soil would bring about seed germination were more than fulfilled. Much of the area looked as though it had been previously sown with radish seed. The seedlings resemble those of radish until they reach the third leaf stage, when, of course, their appearance changes. The germination was greatly increased by a very opportune rain which fell early in October.

Disregarding the few established plants surviving, the disc was again brought into operation and the ground thoroughly tilled; also, the ground around trees and where the disc could not be used was hand-hoed. This procedure dispensed with an application of weedicide requiring possibly 80 or 100galls., and so represented a considerable monetary saving. This cultivation naturally delayed spraying operations, and the first application for the third season's operations was made early in December, 1935.

Up to this period all sprayings had been applied by means of a force spray outfit, but from then on a bucket and hand-spray has been the most economical means of applying the spray. Of the amounts of weedicide used in the third season's spraying a good proportion has been expended in destroying seedling plants.

It will be noted that a fourth application was given this year. This was really a precautionary measure. May is rather a late month to be dealing with convolvulus, but a spell of fine weather gave an opportunity to look over the area and treat any surviving plants. The fact that only 6 pints of weedicide were required clearly shows how effective the treatment has been.

Time to Spray and Climatic Conditions.

Cultivation in any form between sprayings each season is not advisable, since it destroys the continuity of the root system of the weed and so interferes with the conduction of the chlorate to all parts of the roots. Of almost as much importance is the stage of maturity of the plants at which to apply the spray. It is well known that the greatest call on the reserve stocks in a plant takes place towards seeding time. This is the time to attack it. One should aim to get as near as possible to the seeding stage, though it is necessary to bear in mind that it is unwise to allow too much seed to mature. The most effective time to use sodium chlorate is in the advanced flowering stage.

As regards climatic conditions, we have made a practice of spraying on dull days days, the cooler the better, as these conditions definitely tend to allow of better penetration of the weedicide than if applications are made during hot sunny conditions when evaporation is more intense. The effect is more marked if the weed is lacking moisture. Rainfall has an important bearing on this work. If, after growth has again appeared from the unharmed portions of the root system and developed to a reasonably mature stage, there should be about 25 points or more of rain, it will be observed that quite a large proportion of the weed will again die down. Doubtless, this is due to the moisture conveying the residue of the weedicide to a lower level in the soil, where it operates on the root system. Whilst rain thus assists the treatment, too much water, such as irrigation, unless applied by means of a sprinkler, does not give the same result. This is, no doubt, due to the fact that a large body of water dilutes and leaches away the chlorate present in the soil.

It will quite often be noticed that, whilst the general growth of weed is in a suitable condition for spraying, some plants are little more than a few days old, due, no doubt, to penetration by the chlorate to varying depths. This belated growth, if closely examined a few days later, will be found not to respond to treatment to the same extent as the older plants. Although the exposed growth usually burns off, the weedicide rarely penetrates down the stem below ground level.

In the course of our work we have been supplied with three distinct types of sodium chlorate, two of which we found very difficult to dissolve in cold water. This difficulty has been overcome by heating water to about 120° F. and immersing the chlorate suspended in a cheesecloth bag, solution then taking place readily.

As regards the effects of the chlorate on the trees in the orchard, not one well advanced tree showed much outward sign of injury, but quite a number of one and two-year old trees succumbed. It seems quite apparent that the weedicide was responsible for the death of these trees, but in what way is uncertain. Roses, shrubs, &c., also failed to withstand applications of the chlorate in their vicinity.

In direct contrast to these results, however, convolvulus has been eradicated in lawns without ill effects to the constituent grasses. The method used was to carefully remove a piece of turf about 4 inches square and to trace the convolvulus stem down to a depth of about 6 inches, tapering the hole. About a quarter teaspoonful of sodium chrlorate was placed in this hole and a little water added. The earth was then put back and the block of lawn replaced and watered. About 30 such holes were treated once only in this way about two years ago, and no convolvulus has since appeared in the lawns.

It has been my practice to examine the trees the day following an application of spray, with the object of removing any low-hanging branches and sucker growth, which are sometimes difficult to avoid when applying the spray.

Although we have usually been able to apply the weedicide following solution, should it be necessary, the retention of strength in such form is obtainable by storing it in an airtight container—wooden preferably.

Care in Handling the Spray.

As regards the precautions to be taken when using chlorate sprays, I would stress the importance of these. Though the chlorates can be safely handled with reasonable care, it should be remembered that the residue of sodium chlorate left after evaporation of the solution will readily ignite. On two occasions I have seen it ignite by friction, and cases have been reported where sprayed material has burst into flame during exposure to the hot rays of the sun. We have been careful to avoid handling or applying the spray when the degrees of temperature are high. When sodium chlorate is being handled, care should be taken not to have inflammable materials nearby, and clothing, &c., which has become wetted with the solution should be carefully washed in water before being allowed to dry.

Though the chlorates are actually poisonous to animals, there is very little danger of fatalities occurring as a result of stock being allowed access to sprayed areas. The chief danger would be due to the chlorate concentrates being left exposed and used by animals as salt licks. So long as care is taken to avoid this, the risk of poisoning is almost neglible. Due to the strong oxidising effect of sodium chlorate, all spraying apparatus should be thoroughly cleansed after being used.

Soil Erosion

[T. M. DRUMMOND, Yeelanna Conference.]

The problem of soil erosion is one which throughout the world is beginning to force itself more and more upon the attention of those interested in the soil. Although its effects have been understood, and the results arising from both wind and water erosion in many parts of the world are quite plain, no attempt to deal seriously with the problem has been made until comparatively recent years. America and Africa are the chief sufferers. In Australia, a more newly-opened country, its effects do not appear to be so great. However, sufficient examples have occurred, and some attention is being focussed upon it. We are beginning to understand that it is likely to become a serious problem unless preventive measures are taken. America has found it necessary to take steps in combatting this evil, and at present she leads the world in this respect.

Water Erosion.

I propose to confine this paper to water erosion solely, since wind erosion plays but a small part in the heavy soils of this district. Erosion, at first sight, does not seem much in evidence here at present, but it is likely in the course of time to prove a problem, if a minor one, owing to the sloping nature of much of the ground. There is quite a number of small farms where small gutters are beginning to make themselves an inconvenience. These will become worse as time goes on and may seriously interfere with the efficient working of various paddocks. When the land was in its virgin and uncleared state, the accumulation of years of debris went to form and keep a sufficient supply of humus in the soil, so that rain was absorbed as it fell and water prevented from washing the ground into runnels or creeks. The roots of mallee and other bushes and scrub plants assisted in keeping the soil from moving by their mechanical action in holding the ground together with the massed network of their fibres. Also, to an extent, the roots would assist otherwise by absorbing a percentage of the water for the use of the plants themselves. When the scrub was cleared, ploughing the ground broke up and destroyed these roots, and the successive crops caused a depletion in humus.

In the first years on a new block, the owner concentrates on the destruction of the shoots and the land is cropped with that end largely in view. Little, if any, secondary growth occurs for a few years on new land, and as the stubble is burned off to scorch the shoots, no material which would replace the humus is returned to the soil. The land consequently begins to lose its water absorbing capacity, and rain tends to wash off the surface rather than be absorbed. This washing again helps to remove humus, and the process tends to become a vicious circle. Of course, as the land becomes older and weeds, clovers and other fodder plants appear, the position in regard to humus is eased, but by that time embryo creeks and gutters have already made their appearance, and gradually become worse. The usual method of dealing with those, as far as my observation goes, is as follows:—Generally the plough is run along the length of the gutter from both sides, and it is filled in; that is where the gutter is sufficiently small to allow this. Larger gutters may have straw or stones placed in them at intervals of their length, as an aid in silting up. These methods are an aid only, and not a cure. Those ploughed in will open again at some future time if the wash is sufficiently heavy. So also will those where silting up has been successful. Or else, in either instance, new gutters will be formed in the vicinity of the previous ones.

Contour Draining.

The method that I wish to bring under notice is entirely different, and properly applied, will prevent the formation of these inconveniences. Once laid down, it is permanently in place and needs no attention, or if it does, this is so small an item that it may be discounted altogether. Briefly, it prevents water from accumulating in sufficient quantity to wash the soil. It prevents humus and soil being removed by the mechanical action of moving water, which is responsible for these gutters and washaways. It is known as "contour draining" and is quite a simple method; one which takes up little more time to put in than ploughing in gutters as they form from time to time. Once constructed, the drains are permanent, offer no impediment in any way to the working of the ground, or to growth of crop or feed. The drains consist of very low banks which follow the natural contour of the slope just sufficiently off level to prevent water from accumulating, and forming a soft or muddy patch.

It has been found by experiment that the best results accrue in having the drains or banks at 4ft. vertical intervals from each other. These banks are so low that they are quite unnoticed by any of the implements used on the farm. Having them at 4ft. vertical intervals prevents an accumulation of water after rain, so that there is none of the wash which causes gutters. The drains themselves do not become so saturated as to make unworkable the ground on which they are situated. They are terminated at their lower end where possible, in some natural getaway such as an already existing creek which is too large to deal with. Their end may be left in the air, but a creek will gradually be formed in the line of their termination in the course of time. However, if they can be terminated upon waste ground, this will not matter very much. Or perhaps, if the creek is formed against a fence, this would be more convenient than having it in the middle of the paddock. The whole idea is to prevent water moving with sufficient body and force to cause movement of soil in any way.

By having the banks at regular vertical intervals, the steeper the slope the closer they are to each other; in this way the force of movement of the water is broken, and what would become a fair wash if allowed to gather the force of great distance, is converted into a gentle seepage. The closeness of the banks to each other depends entirely upon the slope, and may vary from a distance between each from 5 chains apart upon a moderately steep slope to 20 or even 40 chains apart upon an easy gradient.

The construction of these banks or drains is a simple matter, and the time required to peg them out and finish them off would not be much. All the tools required for laying out the courses are a number of pointed pegs, say 9in. long, a level, a 4ft.-stick, and a measuring contrivance for measuring the required slope. When the contours are pegged out, all that is necessary is to follow the line of pegs, with any suitable disc implement, such as a 14-disc sundercut, 2 or 3 times from the one direction, so that the soil is heaped to one side and forms a low bank. The method of laying out the line for the drains to follow is somewhat like this:—At a point farthest from the place of termination or outlet, a sight is taken with the level on its 4ft. stick upon the highest point. When this is obtained, a peg is driven where the end of the stick rests. The measuring contrivance which is 16ft. long and has one leg or peg 1in. longer than the other, is then placed so that its shorter leg is against the peg in the ground. It is then moved about until a level placed on it shows neutral. A peg is then driven in against its longer leg, and the process is repeated until the drain is pegged out. As 16ft. approximates to ¼ chain, this should not take long. A return is made to the starting point, and the 4ft. stick and level used again to take a sight upon the initial peg, and the next drain pegged out in a similar manner. All that remains when that is completed is to run a disc plough several times one way along the line of pegs. The slope of 1 in 192 and the vertical interval of 4ft. given to the drains prevent anything but a slow seepage which is equivalent to natural drainage under the best conditions.

I would like to add that I am indebted for all the information about the drains and measuring device to an article which appeared some years ago by an officer of the Department of Agriculture in one of the other States.

Destroying Mallee Scrub

[H. H. MYERS, Mount Hope (Yeelanna Conference.]

Mallee scrub is very hard and rather expensive to destroy. Once it is destroyed, a lot of benefit is soon derived from the land on which it was growing, whether the land is arable or stony. It has been my experience, to a very limited extent so far, that once the mallee is destroyed on the stones, feed soon commences to take its place; so the problem arises as to which is the cheapest method of getting rid of it.

I have tried one method of destroying the mallee on stony country which seems to be successful. This is to have the scrub rolled or cut, ready to burn later in the year, and before the burning season closes. Then, when the mallee is burnt, and as the young shoots grow to about 6in. high, go over the ground and pull or knock them off with a grubbing axe or any tool that is suitable. It is essential that they be kept down while young. After going three times over the ground between November and February the shoots will be killed, and they will not come up again. The only fault with this method is that it would, if a large area had to be gone over, take a fair amount of labour. I believe that the results that follow even this method of getting rid of the mallee would be worth while. It seems to me that, by keeping down the young shoots, there is no outlet for the sap which is rising rapidly, especially towards February. This method, although it has its advantages, is a very tedious job.

Then there is the fire rake, which is, I think, the cheapest means of killing the mallee, but it is only practicable on arable ground. Two good burns with the fire rake in February, if possible, will kill 70 per cent. of the mallee and broom.

Another means of killing the mallee is by the shootcutter. By cutting the shoots every year they will eventually be killed. But it is a long process. I would prefer the method of pulling the young shoots as I have explained it at the beginning, because often about three times over and the mallee is killed. It has recently come under my notice that spraying mallee with a preparation similar to the material used by the railways for killing grass will also kill mallee. As yet I have not tried this method, but I believe it would be worth a trial. If it were a success it would be cheaper than any other method. It would be necessary, however, to close the paddock against livestock for at least a year. I can show patches where I have successfully killed the mallee by the first method explained in my paper on a small area, and what can be done on a small area can also be done on a large area.

Lucerne in the Yeelanna District

[R. W. Pearson (Yeelanna Conference).]

If there is one aspect of mixed farming which lends itself to further development it is that of raising fat lambs for export. A district such as this, enjoying a reasonably adequate rainfall, much of which has access to the Tod water reticulation scheme, which is in close proximity to the freezing works both by rail and road, and which generally speaking contains soil quite the equal of most districts in the State, surely presents avenues for great development along these lines.

The chief disadvantage would appear to be that feed is generally backward in the early winter, and because of this the competition from earlier districts is somewhat acute. I am sorry to have to use the word "competition" as amongst farmers themselves, but the truth is that with the present capacity of the Port Lincoln freezing works there is a danger of the later maturing lambs not getting in before flies and grass seeds become troublesome. This state of affairs may be, and undoubtedly will be, only temporary, but it would seem that development of the freezing works will always lag somewhat behind the progress of the lamb raising industry.

It is with this thought in mind that I venture to suggest lucerne as being at least a help in overcoming this apparent disadvantage. There are few fodders which respond more readily to rains while the ground is still warm. Because of this it would seem more suited to districts more subject to summer or autumn rains, but in a district such as this, when rains are usual in April or early May, lucerne would still grow vigorously, as the ground at that time is still comparatively warm, as well as air temperatures, generally speaking. This being so it appears that ewes with lambs dropped in April or early May, as the growing tendency seems to indicate as being most suitable, would have a reasonable chance of a good supply of succulent and milk-producing green picking on farms where lucerne was established. Lucerne at any rate will provide that green which is so essential, and provide it earlier than most other fodders which are commonly grown. There are several grasses, &c., which do well in late winter and spring, but it appears to me that we must look for something such as lucerne to provide the early pasture at the critical period when the

Typical Australian Lucerne.

lambs are being dropped, and immediately afterwards.

Establishment of Lucerne.

Soil.—A great deal of this district would grow lucerne quite well. Soil containing a plentiful supply of lime is especially suitable, while sand or sandy loams also give good results. Lucerne will not do well on soils where stiff clay is in evidence close to the surface, as this type of soil has a tendency to become water-logged during winter. In short, most free-working soils are capable of giving a fair stand of lucerne.

For luxuriant growth lucerne requires plenty of water, but the water must be moving water and not stagnant. I have seen lucerne in an overflow watercourse from a dam. In this case in the late spring and early summer these few acres grew prodigiously and were usually cut with a mower. The lucerne hay was then raked and subsequently carted into a stack. This stack fed cows for months each year, and at times fed sheep in the late summer. In this form lucerne is wonderful dry feed.

Lucerne could turn many limestone outcrops, which otherwise are unsuitable for culture and therefore almost useless, into valuable grazing ground.

Sowing.

The land should be carefully fallowed and subsequently worked down to a fine tilth. Lucerne requires favourable conditions to ensure a good germination, and too much care cannot be taken at this stage. It can be sown in several ways. I have seen it sown with a cereal crop as cover, the best method in this case being to sow the grain first with harrows attached to the combine, and then shortly afterwards run over the paddock again with the combine tines lifted out of the ground, merely dropping the lucerne seed on the surface, again having harrows behind sufficiently heavy to just bury the seed. Any such method is effective, bearing in mind always that it is fatal to sow deeply. To mix with the super. and sow at the same time as grain is not recommended for this reason.

The amount of seed sown should not be less than 4lbs. per acre, with a liberal dressing of super.—not less than 1cwt., and if possible more when sown with a cereal crop——in order to secure a good start. If sowing with a crop sow some of the super. with the cereal and the balance with the lucerne, to make sure that the young lucerne plant has access to it. Lucerne can also be drilled in on stubble land, where the crop was clean, using a liberal dressing of super. Above all, any land sown to lucerne must be clean and free from weeds, particularly barley grass. The sowing in this case may be done in late autumn if rain has fallen, while on fallow it may be done as late as July, providing the ground is not too wet. It is not of course essential to grow a cereal crop for cover, as it is quite satisfactory to sow on well-prepared fallow, but again seed must not be buried deeply, super. must be used, and land must be clean.

Subsequent Management.

The foregoing methods should ensure a reasonable stand of lucerne. It should not be grazed until well established. As mentioned previously, it will provide excellent grazing where sown with a cereal crop, after grain has been harvested. When stubble is sufficiently thinned out it is advisable, as with stands established in any other way, to cultivate the field lightly each year and if possible dress with a moderate quantity of super. If not thus cultivated, rubbish, such as barley grass, will take control, and while not destroying the lucerne completely, it will considerably check it. The lucerne plant itself also thrives on cultivation, and once established is very hard to eradicate. If treated on the foregoing lines, a stand will last for years.

When sowing lucerne, it should always be sown over a whole field, otherwise when the paddock is grazed stock always concentrate on the lucerne and do not give it a reasonable chance. Lucerne does not seed itself, hence a sufficient quantity should be sown to ensure a thick stand. It should never be allowed to flower, always being grazed before the plant becomes too woody or thick-stemmed.

When seed is desired, it can be left until the seed is ripe and then harvested with any

beater harvester. It is necessary to have chain driven elevators, as leather belts are liable to slip. If a fairly coarse screen is used in delivery worm to the grain box, lucerne will go through into the screening box, and can be bagged from there; while any foreign matter, such as thistles, &c., will run off into the big grain box.

To sum up, the main points are:—1. Thoroughly prepare land to fine tilth, and make sure all weeds are killed. 2. Sow at least 4lbs. seed, and 1cwt. super., as shallow as possible. 3. Do not graze too soon. 4. Cultivate lightly, and top dress annually. 5. Never allow plants to flower if used solely for grazing. 6. Lucerne does not do well where ground is waterlogged.

Producing Pigs for Market

[G. Lawrie, Ungarra (Yeelanna Conference).]

Breeding.

For breeding we use mainly Tamworth-Berkshire cross sows. We also have one Large White sow, which we have used with good results. Pigs bred from other sows never meet with the same approval by the manager of the bacon factory; he can pick them out at a glance and we lose ½d. per lbs. The Large White sow has large litters and the pigs grow very quickly, particularly after weaning. The last litter from this sow was taken to market at five months old, the lightest pig weighing 114lbs. The sire used is the Large White.

Feeding.

The main feed is crushed barley and a little crushed wheat. Crushed, the grain goes twice as far as if fed whole. The wheat we crush finely to feed to the weaners instead of pollard. The self-feeder saves much time in feeding. The one we use is 12ft. long, made of flooring board and tin, and is capable of feeding 50 pigs or over. This is kept in a large covered-in shed, from which the pigs have a run into a small paddock of greenfeed. These pigs are put in there as weaners and kept there until a month old before taking them to market. From these pigs we select 12 to 15 of the largest every three weeks and put them into sties, allowing 2 pigs to each sty. These are kept for a month and topped up with 4lbs. barley per pig with a drink of separator milk mixed with water after feed; also a little at midday. By adopting this method we find no difficulty in having firm bacon for market. It is also necessary

to give them a mixture of charcoal, Epsom salts and super. Pigs are fond of charcoal and will consume large quantities if they can get it. We do not feed milk or crushed grain to the sows until a fortnight before farrowing. These we give soaked oats run along the ground and plenty of water; also greenfeed when available. The bulk of our separator milk is fed to weaners, growing pigs, and sows with litters.

We keep a record of the barley we use and find that it takes 7 to 8bush. of crushed barley to get a pig ready for market. This barley being second grade could only be valued at 14s. to 16s. and the pigs are sold at from £2 15s. to £3 10s. each. We find that a well-balanced ration fed regularly to pigs is more satisfactory than giving them large quantities.

Housing.

Pigs require sties that can be kept clean and cool and yet provide warmth in the cold weather. The shed we have for our dry sows is in the shape of a T, where the pigs can go either side, warm in winter and cool in summer. This is built of stone with a straw roof. About a month before farrowing each sow is put into a sty with a small paddock. These sties are built of galvanised iron with a cement floor and a rail around the inside about 6in. from the ground. This rail prevents the sow from lying on the little ones, and we have found it a good method. The shed for store pigs is built of stone with a straw roof and concrete floor with a drain. The water is laid on to enable us to hose it out when necessary, and plenty of dry straw is provided for bedding. This shed is 50ft. long. Our fattening pens are also built of stone with straw roofs. These pens each have a separate door which opens on to a race, along which the pigs are driven and up a ramp to the truck when we want to take them to market. These pens and the race also have concrete floors. Once a week we spray all sties and sheds with phenyle mixed with water, using a spray pump. This keeps them free from lice and fleas. When we draft the weaners from the sows, we bath each one in a large tub made for the purpose. We use Lifebuoy soap and a scrubbing brush. They keep white and clean until marketing.

Value of Sport to the Farming Community

[H. E. Broad (Minnipa), Minnipa Conference.]

To farm successfully one must have contentment in the home. It is practically impossible to get that contentment if members of the household do not get a little relaxation from work to keep off the dreariness of farm life. The old proverb, "All work and no play makes Jack a dull boy" has stood the test of time. It is no wonder that the young people from the out-back want to live in the city, when they see the conditions under which their city cousins live, with short hours and plenty of spare time to indulge in sports of all kinds.

It has been said that Australians play too much. If that is so—and I very much doubt it—it certainly does not apply to country areas. With an average working week from 50 to 60 hours and only Saturday afternoons—3 to 4 hours—for play, it does not seem that we play too much in the country.

Some farmers say that they have no time for sport. Perhaps they find plenty of interesting little jobs to do on the farm and so do not worry to follow it. Personally, I think life would be very dull without sport.

Sunday sport has been condemned by a certain section of our community, but I see no harm in it, providing it does not interfere with any religious body.

One of the most important advantages of country sports is that it helps to keep money in circulation in the country area.

We must help to make life more pleasant and encourage sport. In so doing, we will keep the rising generation with us, which is most essential for the district, and for the State.

The Benefits of Lime to Orchard and Vineyard

[E. R. Radford (Greenock Conference).]

The higher rainfall areas in most countries are deficient in lime through its having been leached from the surface soils and often deposited in the form of rock inaccessible to plant life. This surface deficiency has to be replaced to maintain maximum plant growth.

Forms of Lime used in Agriculture.

Gypsum, which is calcium sulphate, is different in its action from calcium carbonate, which includes air-slacked lime, ground shell, limestone, marble or coral. Phosphate of lime is another form which is used mainly for its manurial value as a phosphate, being ground phosphorite or apatite rock.

Gypsum has been extensively used as a corrective of stiff clay soils, particularly on our river settlements where adjacent deposits make it an economically sound proposition. It is quite effective, as it coagulates the clay, i.e., makes it loose and friable, thereby making it easier to work. It also liberates potash, but it is not effective as a sweetener of cold, sour soils.

Carbonate of lime on the other hand is just as effective as gypsum as a soil loosener, and it also has the very valuable property of correcting acidity in sour and impoverished soils. Lime can be regarded as a manure, as its presence in soils to some degree is essential to healthy plant life, whether it be tree, vine or cereal.

Wood ashes contain a varying percentage of lime from about 40 per cent. in mallee to 12 per cent. in apple. Lime is a plant food, but its chief action is to correct acidity in soils, destroy the ill effects of certain soluble iron salts, liberate other plant foods such as phosphate and potash, help the process of nitrification by accelerating the decomposition of vegetable matter, and to make impervious, sticky clays friable and porous.

It is the last of these numerous uses that I wish to lay stress on, as in a district such as this, many orchards and vineyards have patches of hard clay soil which are extremely difficult to work, unless this is done immediately after a good rain; which is often impossible where a large area is to be covered. By applying lime in the crude form of shattered decomposed limestone, this type of soil can be made loose enough to work down finely under any conditions. Clay patches that previous to application had remained in huge clods which a set of harrows just bounced over unless it was too boggy for a team to walk on, will now break down finely when being turned by the plough, and often do not need harrowing. These clays used to shed any moderately heavy rain, being almost impervious, even after heavy dressings of farmyard manure, but they now absorb practically all the moisture that falls. Trees and vines on these treated areas show marked improvement both in their capacity to bear crops of good mature fruit, and to make strong wood growth. They also carry their foliage much later than previously. I find the application of this decomposed limestone, which on analysis shows 68 to 70 per cent. calcium carbonate, a cheap proposition, as there are deposits on my property. There are several deposits in the vicinity, and 2 plugs of gelignite in a 3ft. hole will give about 2 dray loads of pulverised and broken stone, which is applied fairly thickly. Apart from a thin hard crust of about ¼in. to ½in., all lumps will break up with the ordinary working of the soil. The effects can be seen almost immediately, and have been known to last for 40 years.

Of course it would not be a payable proposition to apply carbonate of lime in the form of ground shell or air-slacked lime at the rate of about 15 tons to the acre, as I do with the soft limestone, but it must be remembered that this heavy application is practically everlasting, as a little more lime is broken up every time the land is worked. I strongly advise anyone having deposits of this soft limestone on his property or in the vicinity to use it, even if only half the quantity is used; which may be sufficient if the soil is not very stiff.

These large quantities are not needed to sweeten cold, sandy soils, and 1 ton of calcium carbonate every 5 years or so would be very beneficial.

Vines thrive on lime, and in some localities can be seen growing in apparently solid limestone. The action of lime in liberating potash, which is generally plentiful in a form not available to plant life in most of our heavy clays, is of great economic value, as potash with lime is assimilated by the plant and is converted into carbohydrates, which form the fats and starches in cereals and the sugar in fruits. Therefore, lime means fruit with a high sugar content. Nitrogen, which promotes strong vigorous growth for the next season's fruit wood, is liberated and encouraged by the application of lime, as it definitely promotes the activity of nitrogen producing bacteria in the soil.

Calcium phosphate, as it contains so much lime, when finely ground, is also beneficial to sour wet soils, and nitrogen, which is generally lacking in this type of soil to a marked degree, can be applied in the form of sulphate of ammonia in conjuction with the calcium phosphate, as it liberates the phosphates more quickly.

Wheat v. Mash for Poultry.

Replying to the question, "Is soaked wheat better than mash for poultry?" which was asked at the Greenock Conference of the Agricultural Bureau last week, Mr. C. F. Anderson (Government Poultry Adviser) says:—

"Feeding of soaked wheat to poultry has not been practised by this Department. There are, however, a number of commercial breeders who are using this method of feeding. The method originated in New South Wales, the principal reason for its adoption being the difficulty of obtaining pollard of a grade suitable for feeding to poultry. Like all methods of feeding, however, the question of cost is the main item.

The method adopted with soaked wheat is to first soak the grain in some suitable vessel, such as a kerosene tin or oil drum, pouring water over until its level is about 1in. above the wheat. After 24 hours the surplus water, if any, is drained off and the meat meal is then worked through the wheat. If any moisture is still present, the wheat could be dried off by adding a little bran. Then a kerosene tin of chaffed greenfeed is worked into the mash and the mixture allowed to stand until the next morning's feed. The same procedure is followed for the evening feed of soaked wheat.

The average ration of soaked wheat for 100 birds for each meal is 8lbs. The following is a comparison of some of the standard methods of feeding adopted by poultrymen.

Based on the feed required for 100 birds, the cost would be as follows:—

> Soaked wheat on the basis of 16lbs. of wheat a day, with wheat at 5s. per bushel, equals 1s. 4d. per day.
>
> Standard mash of bran and pollard at £6 per ton, wheat on the basis of 5s. per bushel, bran at £6 per ton, with 3lbs. per day, equals 2.16d.; pollard at £6 per ton, with 6lbs. per day, equals 4.32d.; wheat on basis of 2ozs. per bird, 12lbs., at 5s. per bushel, equals 1s.; making a total of 1s. 6.48d. per day.

In a number of districts barley is now being fed fairly extensively, and taking the standard as is being fed on the Poultry Settlements under the direction of the Employment Promotion Council and on the basis of 100 birds, the cost is as follows:—

> Bran, 3lbs. at £6 per ton, equals 2.16d.; crushed barley, 6lbs., equals 4.86d.; barley as a grain, 12lbs., at 3s. 3d. per bushel 50lbs., equals 9.36d.; total, 1s. 4.38d.

There are, however, other aspects to be taken into account as well as the bare cost of feeding. There is the question of labour, production, fertility, &c., to be considered. The practice of feeding soaked wheat has not been in use long enough to express a definite opinion. I very much doubt whether any one food is a suitable ration for poultry."

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of October, 1936; also the average precipitation for October, and the average annual rainfall.

Station.	For Oct., 1936.	Av'ge. for Oct.	To end Oct., 1936.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta ..	1·87	0·44	4·06	4·62
Marree	0·91	0·47	3·68	5·83
Farina	0·82	0·51	3·70	6·37
Copley	0·36	0·48	3·90	7·85
Beltana.......	0·68	0·52	4·70	8·47
Blinman	0·48	0·77	5·39	11·81
Hookina	0·94	0·60	7·58	11·18
Hawker	1·23	0·80	8·08	12·22
Wilson	1·36	0·89	9·49	11·77
Gordon	1·14	0·79	6·49	10·46
Quorn	1·24	1·14	7·63	13·15
Port Augusta..	0·90	0 86	6·91	9·40
Bruce	1·15	0·84	10·12	9·74
Hammond	1·06	0·98	8·23	11·11
Wilmington ..	1·46	1·49	14·78	17·28
Willowie	1·33	1·01	8·51	12·22
Melrose	1·89	2·02	19·26	22·85
Booleroo Centre	1·41	1·33	10·44	15·21
Port Germein .	1·22	1·13	8·67	12·53
Wirrabara	1·65	1·68	11·86	19·25
Appila........	1·28	1·34	10·28	14·62
Cradock	1·22	0·88	7·28	10·78
Carrieton	1·16	0·97	8·62	12·19
Johnburg	1·18	0·87	8·47	10·56
Eurelia	1·15	1 01	8·95	12·76
Orroroo.......	1·45	1·09	10·30	13·20
Nackara	0·97	0·72	14·61	11·09
Black Rock ...	1·24	1 02	9·45	12·35
Oodlawirra ...	1·07	0·71	10·73	11·67
Peterborough..	1·25	1·12	9·84	13·22
Yongala	1·44	1·26	12·21	14·43
North-East.				
Yunta	0·67	0·72	6·89	8·84
Waukaringa ..	0·63	0·64	6·81	7·89
Mannahill	0·72	0·76	5·52	8·16
Cockburn	0·97	0·63	7·34	7·91
Broken Hill ..	0·65	0·80	6·92	9·50
Lower North.				
Port Pirie	0·89	1·24	9·94	13·19
Port Broughton	1·67	1·23	9·09	13·85
Bute	2·08	1·37	11·00	15·39
Laura	1·86	1·71	12·93	17·97
Caltowie	1·34	1·55	11·02	16·76
Jamestown....	1·65	1·63	12·40	17·72
Gladstone	1·28	1·58	10·20	16·32
Crystal Brook .	1·11	1·53	10·09	15·76
Georgetown ..	1·40	1·67	11·77	18·29
Narridy	1·17	1·42	9·17	15·77
Redhill	1·73	1·47	13·55	16·54
Spalding	1·38	1·76	11·40	18·74
Gulnare	1·11	1·70	11·81	18·59
Yacka	1·23	1·35	11·26	15·38
Koolunga	1·45	1·41	9·80	15·32
Snowtown	2·14	1·39	12·79	15·70
Lower North—*continued.*				
Brinkworth	1·36	1 38	9·80	15·73
Blyth	1·99	1·48	13·12	16·73
Clare	2·25	2·14	20 86	24·45
Mintaro	2·60	2·09	18·54	23·36
Watervale	2·98	2·33	22·67	26·74
Auburn	2·95	2·16	19·41	23·96
Hoyleton	2·40	1·62	15·86	17·27
Balaklava.......	2·12	1·44	10·67	15·43
Port Wakefield ..	1·93	1·13	9·84	12·93
Terowie	1·38	1·19	12·53	13·34
Whyte-Yarcowie	1·22	1·18	12·66	13·58
Hallett	1 64	1·48	12·59	16·41
Mount Bryan....	1·43	1·39	13·22	16·77
Kooringa	1·68	1·69	13·48	17·81
Farrell's Flat ...	1·53	1·67	15·76	18·54
West of Murray Range.				
Manoora	2·16	1·79	15·01	18·94
Saddleworth	2 69	1·76	17·70	19·59
Marrabel........	2·59	1·80	16·87	19·96
Riverton........	3·17	1·89	18·53	20·79
Tarlee	2·71	1·66	15·25	18·09
Stockport	2·44	1·63	14·66	16·97
Hamley Bridge .	2·29	1·51	12·77	16·52
Kapunda	2·61	1 85	15·60	19·76
Freeling	2·21	1·69	12·45	17·79
Greenock	2·60	2·01	16·36	21·47
Truro	2·12	1·83	14·62	19·79
Stockwell	2·16	1·83	15·34	20·04
Nuriootpa	2·54	1·87	17·46	20·68
Angaston	2·09	1·99	17·27	22·32
Tanunda........	2·37	1·97	16·77	21·94
Lyndoch	2·67	2·15	14·97	23·27
Williamstown ...	2·38	2·36	17·28	27·61
Adelaide Plains.				
Owen	2·28	1·56	13·76	14·64
Mallala	2·17	1·51	11·86	16·49
Roseworthy	2·32	1·68	12·31	17·42
Gawler	2·16	1·74	12·81	18·85
Two Wells	1 46	1 41	10·67	15·76
Virginia	1·62	1·49	12·46	17·20
Smithfield	1·78	1·57	12·60	17·65
Salisbury	1·82	1·58	11·40	18·56
Adelaide	2·43	1·73	15·22	21·14
Glen Osmond....	2·88	2·14	18·06	25·97
Magill	3·16	1·97	16·58	25·37
Mount Lofty Ranges.				
Teatree Gully ...	2·64	2·14	15·39	27·07
Stirling West ...	5·04	3·73	34·13	46·95
Uraidla	5·13	3·32	29·76	43·95
Clarendon.......	3·47	2·61	24·82	32·79
Happy Val'y Res.	3·00	—	18·39	—
Morphett Vale ..	2·73	1·85	16·45	22·59
Noarlunga	3·00	1·61	16·56	20·33
Willunga	2·75	2·15	18·14	25·97
Aldinga.........	2·36	1·58	15·19	20·21

RAINFALL—*continued.*

Station.	For Oct., 1936.	Av'ge. for Oct.	To end Oct., 1936.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	2·84	2·24	20·77	29·42
Inman Valley .	2·55	—	22·38	—
Yankalilla	2·12	1·70	16·71	22·76
Mount Compass	3·18	2·92	25·45	—
Mount Pleasant	2·74	2·37	21·17	27·11
Birdwood	2·57	2·47	19·09	29·07
Gumeracha ...	2·82	2·81	19·64	33·31
Millbrook Res..	3·12	2·83	21·00	34·47
Lobethal	3·88	2·96	25·02	35·91
Woodside	4·02	2·70	21·74	32·15
Hahndorf	4·24	2·98	23·48	34·77
Nairne	3·56	2·43	20·70	28·12
Mount Barker	3·52	2·74	22·32	31·24
Echunga	4·14	2·83	26·88	33·25
Macclesfield ..	3·02	2·63	23·56	30·34
Meadows	4·05	3·03	27·75	36·02
Strathalbyn ..	2·21	1·74	16·93	19·32
MURRAY FLATS AND VALLEY.				
Meningie......	2·92	1·47	15·60	18·31
Milang	1·18	1·31	13·15	14·89
Langhorne's Ck	1·62	1·38	14·58	14·91
Wellington ...	1·76	1·37	13·92	14·65
Tailem Bend ..	1·71	1·47	15·00	15·06
Murray Bridge	0·80	1·28	12·31	13·51
Callington	1·46	1·35	12·39	15·15
Mannum	0·88	1·04	10·53	11·48
Palmer	1·65	1·46	15·75	15·59
Sedan	0·87	1·14	9·16	12·05
Swan Reach...	0·80	0·99	8·75	10·65
Blanchetown ..	0·93	1·08	9·11	11·01
Eudunda	1·95	1·54	15·89	17·15
Point Pass ...	2·24	1·50	17·28	16·72
Sutherlands ..	0·89	0·99	9·51	10·81
Morgan	0·85	0·92	7·37	9·16
Waikerie......	1·28	0·93	10·60	9·66
Overland Corner	0·85	0·95	9·47	10·25
Loxton	0·94	1·03	9·85	11·50
Berri	1·10	0·92	10·13	10·13
Renmark	0·91	1·07	11·01	10·38
WEST OF SPENCER'S GULF.				
Eucla	1·27	0·72	7·30	10·02
Nullarbor	0·67	0·61	4·85	8·85
Fowler's Bay .	0·74	0·84	8·38	11·19
Penong	1·41	0·86	8·96	12·22
Koonibba	2·09	1·02	9·63	12·09
Denial Bay ...	1·86	0·96	9·59	11·19
Ceduna	1·51	0·86	8·39	10·21
Smoky Bay ...	1·37	0·76	7·63	10·42
Wirrulla	1·66	0·98	6·91	10·51
Streaky Bay ..	1·52	0·98	10·15	14·85
Chandada	0·82	0·91	6·83	12·42
Minnipa	1·09	1·23	9·54	13·91
Kyancutta ...	1·29	1·50	9·47	12·77
Talia	1·33	0·97	9·57	14·76
Port Elliston .	2·00	1·16	10·76	16·51
Lock	1·28	1·27	10·37	16·34
Mount Hope ..	1·90	—	12·53	—
Yeelanna	1·04	1·28	10·31	15·94
Cummins	1·59	1·35	11·51	17·58
Port Lincoln..	1·66	1·38	12·92	19·37
Tumby	1·17	1·29	9·35	14·25
Ungarra	1·74	1·50	11·69	16·87
Port Neil	1·54	1·34	9·18	13·11

Station.	For Oct., 1936.	Av'ge. for Oct.	To end Oct., 1936.	Av'ge. Annual Rainfall.
WEST OF SPENCERS GULF—*continued.*				
Arno Bay	1·77	1·27	8·25	12·71
Rudall	1·21	1·11	8·32	12·98
Cleve	1·69	1·34	10·47	14·88
Cowell	2·10	1·13	9·86	11·07
Miltalie	2·34	1·32	10·83	13·70
Mangalo	1·55	1·25	11·68	13·86
Darke's Peak ...	1·31	1·29	9·87	15·08
Kimba	1·63	1·06	7·15	11·68
YORKE PENINSULA.				
Wallaroo	1·73	1·17	9·61	13·97
Kadina	2·16	1·30	10·08	15·60
Moonta	2·38	1·23	9·39	15·06
Paskeville.......	2·19	1·38	13·55	15·47
Maitland........	2·01	1·61	12·08	19·85
Ardrossan.......	1·69	1·24	9·65	13·95
Port Victoria ...	2·50	1·29	10·12	15·41
Curramulka	2·07	1·66	11·98	17·81
Minlaton........	1·96	1·51	11·80	17·74
Port Vincent ...	1·45	1·29	9·45	14·38
Brentwood	2·16	1·41	10·57	15·54
Stansbury	1·92	1·47	11·62	16·81
Warooka	2·50	1·36	12·24	17·44
Yorketown	2·05	1·34	11·11	16·83
Edithburgh	1·70	1·31	10·41	16·37
SOUTH AND SOUTH-EAST.				
Cape Borda	2·91	1·56	20·84	24·80
Kingscote	2·54	1·42	13·83	19·16
Penneshaw	2·34	1·49	15·41	19·00
Victor Harbour .	1·81	1·82	16·08	21·40
Port Elliot	1·93	1·66	16·99	19·94
Goolwa	2·04	1·47	16·44	17·86
Maggea	1·08	0·96	10·73	10·20
Copeville	1·29	1·14	13·86	11·53
Claypans	1·20	1·12	11·22	10·42
Meribah	1·18	1·01	11·59	11·32
Alawoona	1·20	0·91	11·15	10·40
Caliph	0·89	1·54	10·01	10·98
Mindarie	0·92	1·27	17·85	12·23
Sandalwood	1·42	1·32	13·38	13·64
Karoonda	1·65	1·43	13·28	14·17
Pinnaroo	1·03	1·29	11·48	14·36
Parilla..........	1·55	1·28	12·67	13·72
Lameroo	1·89	1·50	13·79	15·87
Parrakie	1·41	1·43	12·03	14·56
Geranium	1·57	1·53	12·74	16·36
Peake	1·23	1·56	11·85	15·93
Cooke's Plains ..	1·61	1·44	14·36	15·28
Coomandook	1·92	1·62	14·10	17·03
Coonalpyn	2·44	1·66	16·20	17·61
Tintinara	2·34	1·71	15·93	18·62
Keith	2·66	1·54	16·15	17·93
Bordertown	2·94	1·76	16·74	19·14
Wolseley........	3·06	1·80	16·87	18·47
Frances.........	2·25	1·96	17·79	20·08
Naracoorte	2·19	2·02	18·14	22·63
Penola	3·08	2·30	20·09	25·96
Lucindale	2·56	1·95	21·98	23·38
Kingston	2·72	1·75	21·32	24·24
Robe	3·21	1·70	21·71	24·64
Beachport	2·68	1·78	24·26	27·06
Millicent	3·29	2·22	28·33	29·83
Kalangadoo	3·32	2·74	26·51	32·20
Mount Gambier.	2·53	2·45	23·20	30·37

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—

Allandale East—25th September, Congress report; 23rd October, "Silage," E. S. Alcock. Appila Yarrowie—2nd October, Conference report. Balaklava—28th September, address, "New Zealand," R. C. Scott. Balumbah—29th September, Congress report. Baroota—21st September, "Noxious Weeds," G. H. Clarke. Beetaloo Valley — 28th September, "Draught Horses," J. S. O'Shaughnessy. Blackheath —1st October, Congress report. Blewitt's Springs—6th October, "Tobacco," R. E. C. Giles. Blyth—28th September, annual social; 16th October, paper, H. W. Neumann. Booleroo Centre—8th October, "Dairying," J. O. Hatter. Boor's Plains—7th October, field day. Brentwood—25th September, annual meeting, "Wool," K. McKenzie. Brimpton Lake—25th September, Congress report; 16th October, "Concrete Troughs," V. R. Dodd. Brinkley—3rd September, Conference report; 30th September, Congress report. Brownlow—23rd September, address, W. J. Spafford. Butler—29th September, Congress report. Cherry Gardens—25th September, discussion. Coomandook—28th September, "Cultivation Methods," R. L. Griffiths Coonalpyn—30th September, Congress report. Cungena—3rd September, discussion, Congress. Currency Creek—6th October, Conference report. Devlin's Pound—30th September, Congress report. Echunga—15th October, "Handling Eggs," E. L. Osborn. Greenock—24th September, "Timbers and their Uses," H. M. Kernich. Hartley—30th September, 2 papers. Hilltown—6th October, debate. Inman Valley —22nd October, field day. Kelly—3rd October, "New Zealand," J. W. Parsons. Koonunga—30th September, Congress report. Koppio—23rd September, "Fat Lambs," H. Gibbs. Kyancutta—6th October, "Fertilisers," G. Strawbridge. Kybybolite—29th September, "Pit Silage," L. S. Davie. Laura Bay—1st September, discussion, Congress; 13th October, address, W. H. Brownrigg. Lenswood and Forest Range—28th September (afternoon), grafting demonstration, G. Harris, (evening), papers (3); 26th October, "Apple Grading," F. Redden. Light's Pass—5th October, Congress report, papers, &c., by High School boys. Lyndoch—29th September, Congress report. Maltee—1st October, Congress report. Miltalie—17th October, homestead meeting. Monarto South—17th October, "Care of the Binder," A. R. Strauss. Morchard—1st October, "Painting Farm Machinery," H. Kupke. Mount Barker—30th September, "Egg Marketing," E. Osborn. Mount Bryan—26th September, Congress report. Mudumuckla —9th October, Congress report. Nantawarra—3rd September, paper, W. A. Starkey; 12th October, "Compulsory Registration of Stallions," S. V. Herbert. Narridy—3rd October, Congress report. Owen—15th October, "Bulk Handling," J. M. McDonald. Paskeville—29th September, Congress report. Penwortham—20th September, "Marketing Control," K. Laught. Pinkawillinie—12th October, "Superphosphate Dressings," A. E. Schaefer. Pygery—29th September, Congress report. Ramco—18th August, address, A. G. Strickland; 31st August, "Bookkeeping," A. E. Seary; September, annual meeting. Redhill—29th September, Congress report. Riverton—27th October, re-organisation of Branch. Rosedale—28th September, "Weeds and Fodder Plants," E. W. Pritchard (Agricultural Botanist). Springton—7th October, question box. South Kilkerran—5th October, "Silage," discussion. Stockport—30th September, "New Zealand," R. C. Scott; 6th October, Visit to Roseworthy College; 23rd October, Congress report. Strathalbyn—16th September, "Care of Eggs," E. Osborn. Sutherlands—9th October, "Poultry," W. C. Johnston. Tantanoola—3rd October, Congress report. Taragoro—27th August, "Sidelines," A. Crabb. Truro—19th October, "Care of Milk and Cream," H. J. Apps. Ungarra—12th October, Congress report. Waikerie—12th October, "Citrus Industry of U.S.A.," F. H. Metters. Wallala—10th October, discussion, "Wheat *versus* Sheep." Wandearah—Congress report; 20th October, social evening. Wepowie—23rd June, annual meeting; 9th September, "Wool," C. A. Goddard; 28th September, "Rugging of Sheep," E. Yeatmann. Whitwarta—21st September, "Fodder Plants," W. C. Johnston. Wilmington—22nd September, "Noxious Weeds," G. H. Clarke; 20th October, "Stock Shelters," W. C. Abbott. Yadnarie—29th September, "Fencing," K. H. Gillen. Yundi—23rd September, address, M. Jacobs.

Bulk Handling of Wheat.

[J. Ryan, Upper Wakefield.]

The more familiar advantages of bulk handling are:—

1. The saving in cost of bags, variously estimated at from 4 per cent. to 10 per cent. of present purchases; the bags should last 4 seasons. There is considerable difference of opinion regarding this item, as must necessarily be the case when different methods of harvesting, cartage, distance, &c., are taken into consideration.
2. The wheat would be handled more quickly and cheaply.
3. Railway trucks would be handled more economically, less delay occurring in loading and emptying.
4. Losses which now occur in storage under the bag system, due to weevil, mice and climate, would be prevented.

Its Advantages.

There are other advantages worth discussing more fully. For instance, it should be possible for the farmer to obtain a better price for his wheat by the adoption of grading, which would be possible with bulk handling. The "f.a.q." system is not satisfactory; nevertheless, it is the only system open to farmers so long as wheat is handled in bags. "F.a.q." system never gives the farmer the benefit of the doubt; the standard is always set low enough to be safe. It is distrusted by farmers. If a farmer's grain is below standard he may pass it through as "f.a.q." because the merchant is also receiving wheat above the ruling standard. The farmer selling the better product gets no more; in fact he is penalised for growing the best. During the 1933-34 harvest wheat in many parts of Eyre's Peninsula was light. All buyers decided only to receive wheat on a 58lbs. basis, which resulted in every farmer in the district affected being docked 2d. a bushel, irrespective of the 60lbs. standard. As probably 50 per cent of the wheat was up to standard this injustice was shared not only by the farmers, but by many agents. When the "f.a.q." standard is set lower than it should be (and this is easily possible) it is also lower in England and there is resultant loss to the farmer and incidentally to the State. In England buyers are known to take little notice of the "f.a.q." set by the different States in the way of differentiating between them, and invariably buy on the basis of the lowest "f.a.q." Therefore, one State may be penalised for the misfortune of another. There is no inducement whatever to grow a good sample and clean it as it should be cleaned. With bulk handling, many farmers would not recognise their own wheat as it poured out of the bags into the elevator, yet such an experience is necessary to many. The farmer cannot altogether be blamed for the chaff and dirt in the wheat as he knows he gets no more for cleaning it properly. How many farmers are satisfied with the merchants so-called "free storage"? There is no such thing as free storage; expenses incurred in storage are met by the farmer ultimately. Once the wheat goes over the scales it is virtually sold. Free wheat in New South Wales—where bulk handling has been adopted—fetches 3½d. per bushel more than similar wheat in South Australia. Much of this extra 3½d. is attributable to the wheat being "free." Consider the weighing of bags; how many split pounds are received on a load of wheat? A weighbridge would not only be fairer, but quicker. Another point in favour of bulk handling is that appreciation in the weight of wheat—known to occur during storage—could, in a publicly-owned plant, be put to offset construction costs. The farmer also rightly objects to maintaining so many country agencies, which are doubtless a charge against his wheat. The farmer is bound to store his wheat in some seasons, and so is at the mercy of merchants. With a bulk storage unit at the siding or at a reasonable distance, independently operated, he would receive a certificate of weight, which could be made negotiable and so he could sell at will with unlimited competition from buyers in the city and elsewhere; he could also take advantages of millers' offers.

AND DISADVANTAGES.

First there would be the expense to the farmer of converting his wagon or truck should he so decide. Rail trucks and ships would need alteration. This alteration regarding ships is now a somewhat out-of-date argument, as shippers prefer bulk handling. In New South Wales bulk wheat costs 2s. 6d. per ton less for freight than bagged wheat, and shippers have stated that they will make a reduction of 5s. per ton when all Australian wheat is handled in bulk. The two most weighty arguments against bulk handling are first the displacement of labour. Machine handling of products seems inevitable, yet it must not be forgotten that the large amount of money now going to India for cornsacks would, if saved by the farmer, be spent on his farm, and thus give more employment. The second sound argument is that South Australia is geographically unsuited to bulk handling, having 9 deep sea ports and some 35 to 40 small ports.

Pasture Improvement.

[E. A. SPRIGGS, Yadnarie.]

The improvement of our natural grasses is best done by top dressing with fertilisers, aided by a light cultivation. If broadcast by one of the various broadcasters there is always a risk of the fertiliser being wasted by heavy rains washing it off the ground instead of mixing it with the soil. Natural clovers respond best to top dressing, and are an excellent feed for all livestock, and once established they are more or less permanent.

For sown pastures—not cereals sown for greenfeed, but grasses such as Wimmera Rye, Perennial Rye, and *Phalaris tuberosa*—of course lucerne has proved to be the best proposition. However, if the land is intended for wheatgrowing purposes as well as for grazing, lucerne may be a hindrance to some farmers when working their soil. Where this is the case adopt Wimmera Rye grass, which is an annual and can be seeded with the wheat. If the land is left out the following year it will be found to produce an abundance of feed if the season is at all favourable. Perennial Rye grass is, as its name suggests, almost a permanent plant, and once properly established it becomes a root grass that is far superior to our natural root grasses. *Phalaris tuberosa* is similar to Perennial Rye, and seeded together on rough waste country they provide fair grazing all the year round, if the summer is cool with an occasional shower of rain. Evening Primrose is recommended for loose, hungry sand that is likely to drift, and it will provide a good growth of feed on sandy soil in various parts of the district.

Discussion.—Mr. Jericho inquired whether the pasture grasses would stand the dry weather which is often evident in this district. He thought the best pasture plant for his country would be lucerne. He had approximately 30 acres of Evening Primrose growing (self-sown), and he thought that it was inclined to be a menace if allowed to spread; certainly he said that it appeared to be good stock feed, but it interfered with crops intended for reaping.

Mr. A. Spriggs said that we should be careful in the planting of grasses, for one cannot tell whether any of them may become a curse rather than a help, especially in these drier areas where the land is principally given over to wheatgrowing. However, he though that Wimmera Rye grass was very good for stock; sheep appeared to thrive as well on the grass when dry as when green. Nevertheless, for early feeding purposes one could not beat barley or oats.

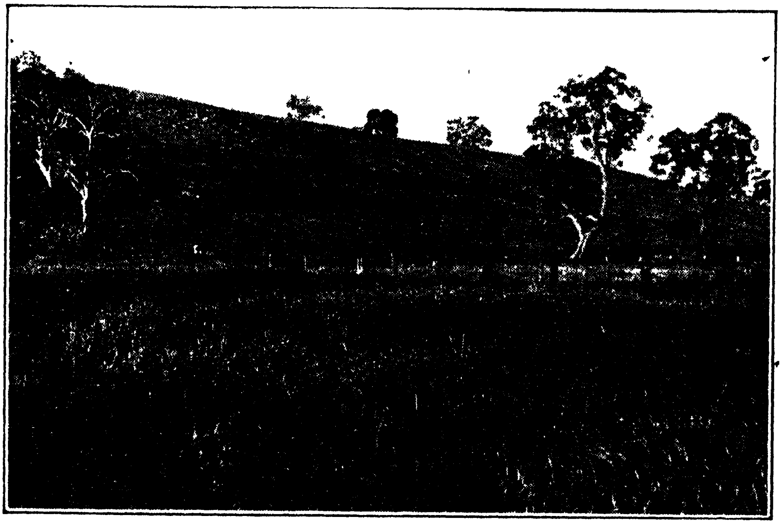
Mr. J. H. Weiss said that the rainfall of the district was not heavy enough to enable pasture grasses to thrive, hence he advocated the sowing of a little more super with the wheat, which would result in a better paddock of feed in the season following.

Mr E. A. Spriggs, in replying, stated that all the pasture grasses mentioned in the paper were substantial in growth once given a start. Further he stated that it had been definitely proved that lucerne would kill out "stinkwort." He partially agreed with Mr. J. H. Weiss in connection with heavier super dressings to improve natural pastures, but thought that he would gain more if he planted other grasses such as were mentioned in the paper.

Sowing of Pastures.

[A. Kemp, Millicent.]

My experience in sowing a pasture is that the first essential is a well-prepared seed-bed, such as where a root crop has been fed off, or a grain crop harvested. If a grain crop, burn the stubble and harrow until a fine surface of half an inch is obtained. The best and most suitable mixture for the black heavy, or grey silty soils of this district is 10 to 15lbs. of perennial rye grass, and 2lbs. of strawberry clover, with 1 to 2cwts. of manure. I would advise using only seeds of the very best quality, such as New Zealand Government Certified Seed. A chain dragged behind the drill will usually cover the seed satisfactorily, but my own experience is that it pays to roll as well. Care must be taken not to cover too deeply. The advantage of this class of seed-bed is that you have a solid layer of soil for the young roots, and the seed does not die off so quickly if a spell of dry weather is experienced. The soil has also been sweetened by exposure to sun and air, or fire; also it is fairly cheaply laid down. I think it very important to have at least a mixture in a pasture so as to get a dense bottom, which is the important thing to aim at. Strawberry clover will grow well into the summer, and is a wonderful milk-producer for cows and ewes rearing lambs. The rye grass will come away with the first autumn rains, and in a lot of places will give a green picking right through the summer. Grazing should be very light and controlled, so that the stock do not bite too short. This type of pasture will carry at least two sheep to the acre from August onwards, and very likely more with good management. Do not let the rye grass seed the first year, and always remember it must be top-dressed every year. My experience is that a pasture will keep on improving for at least ten years, and I do not think it is too much to look forward to the time when, with good management, we can carry on the good soils of this district 5 sheep to the acre. But this means a lot of management, and does not apply to land subject to flooding. Paddocks should not be too large, so that rotational grazing can be practised, and the stock will do much better and be healthier than where they are always in one big paddock. This also gives the plants a chance to seed.



Mr. Kemp said he had quite a lot of failures, but he had always found it paid to make a seedbed, and he had definitely found rye grass and clover the best grasses to sow.

Many questions were put to the speaker, and in his replies he stated that planting should be done after the first rains in autumn. He did not advocate sowing a cover crop such as oats, because clover was a delicate plant, and was likely to be choked out. About ten sheep to the acre should be put on the grass for the first few days and then the stock should be turned out and cattle substituted, because cattle could not eat the grass down so close as could sheep. Cattle should not be put on the clovers when the land was very wet, because they would make a bog of the ground.

Mr. Skeer asked Mr. Kemp if he had had any experience with Colac clovers. Mr. Kemp replied in the affirmative, but he said he considered Poverty Bay clover stood alone. He had tried top dressing on light, calcareous soils with success, and although the grasses did not do so well on this class of soil, he had carried two sheep to the acre. In winter time, the grass was dormant on grey lands. He said rye grass did well in swampy country, and quoted an instance where land he had sown down was now 2ft. under water in places, yet he expected when he saw the land again in September he would find the feed about a foot high. Mr. Kemp said he had tried Wimmera rye grass, but had never given it a proper trial. He had varied the dressings of superphosphate, but had not kept strict check. Mr. Hutchesson said he noticed members of the party of New Zealand farmers who were now touring Australia were saying that the land seen was starving for the want of superphosphate. Mr. Kemp said he favoured heavier dressings, but the problem to contend with was the management when the extra feed was obtained.

Livestock Feeding.

[F. W. Roocke, Brownlow.]

The Horse.

In this district where cocky chaff is of such good feeding value it must be taken into consideration as one of the main fodders in the way of roughage. When a horse is not working and has a little picking out in the paddock it will do quite well only on cocky chaff when it comes into the stable. Of course, this is not a feed to fatten a horse, but if it is in fair condition it will keep the same condition. When working a horse should receive a good feed of hay chaff in the morning with a few handfuls of oats added. It should have about 1½ hours' time to feed in the morning. In the middle of the day it should receive either a good feed of cocky chaff damped with water with a mixture of crushed barley, pollard, and bran added, or a good hay chaff feed with oats; 1½ hours should again be allowed for the horse to eat. At night cocky chaff treated as mentioned before should be given as first feed; when they have finished this each horse should receive at least 2 sheaves of hay, or else as much as they will eat during the night. A horse should always clean up all the feed in its manger before another lot is given it. In this district horses going in good stubble and not working do not require any additional feed. The same applies to greenfeed. That is, if sufficient is available.

Cows.

To get the best results from a cow it should be fed as well as a horse. A cow should not be left to find her own feed in the paddock without giving her any additional feed. It is not necessary to feed cows on hay chaff if plenty of cocky chaff is available, but a good concentrate must be added, such as crushed barley or oats and a little bran. A little linseed meal added to the feed will richly repay one. A cow should also receive some mineral mixture, especially phosphate. Ordinary super will answer the purpose, but a mixture of bonemeal and common salt, or dicalcic phosphate and salt in equal proportions, is better. This will prevent a cow chewing bones, and will protect it from going down with botulism or, as it is mostly called, "dry bible."

Pigs.

Pigs should be fed on a well-balanced ration; that is, skim milk and grain. If milk is not available meat meal is a good substitute. Skim milk and meat meal are rich in protein. This makes pigs grow quickly, and gives them more lean meat than they would have if fed only on grain. Pigs should also have a paddock where they can eat as much greenfeed as they like (this, of course, applies to the winter months only). Barley sown with the first rains gives good picking for pigs. Barley is also the best and most economical food when fed as grain. All grain fed to pigs should be crushed for best results, but if the whole grain is soaked from 12 to 15 hours it will give very good results. Boiling grain for pigs is of no value; in fact, it is not as good as dry grain. Milk fed to pigs without grain is not a balanced ration, and it tends to make the fat very soft. If grain is fed in addition, especially during the last few months, it would finish off a pig well

Handfeeding Stock.

[R. A. Giddings, Yandiah.]

The period between the time when stubble feed is exhausted and the greenfeed starts to grow, of late years at least, has been a matter of months, and it is necessary to handfeed stock to keep them in condition—and in cases in the districts further north to keep them alive—during this period. To the farmer with a limited amount of first-class fodder such as hay or chaff this becomes something of a problem to know how to make a little go as far as possible. To do this it is necessary to have something bulky to which can be added the necessary ingredients to make it reasonably nourishing and palatable to the stock.

The chaff commonly known as cocky chaff, which can be caught behind the reaping machines (nearly all makes have some device which can be attached for that purpose), is, if collected when it is still clean and unspoiled by wet weather, one of the best and most generally-used fodders for supplying the bulk of the feed.

Bran, pollard, molasses, crushed oats, or any other cereal in crushed form are among the ingredients which can be used in quantities to suit the individual requirements of the user. The farmer who uses horses only generally likes them to have the best feed he can provide to get them in good condition for seeding operations, but when he does not have to rely on his horse team entirely for his power they can be fed on a mixture of hay chaff and cocky chaff in about equal parts. Although horses do not take to molasses as readily as do cattle, they can be gradually brought to acquire a taste for it, and the mixture before mentioned can be made slightly damp with some molasses and water—about 2 pints of molasses to 3galls. of water—adding whatever quantity of bran it is required to use.

Damping feed to which bran is to be added tends to distribute it much more evenly than if it is added to dry chaff, and

it also makes it more readily digested. If the farmer does not wish to go to the expense of buying bran or pollard and has grown oats or barley, either of these cereals crushed or ground up makes an excellent substitute.

For cows the same mixture can be used with a greater quantity of cocky chaff and a smaller amount of hay chaff. About 1 of hay chaff to 4 of cocky chaff is approximately the quantities we have used, and this has been adequate to keep cows in fair condition. If the cocky chaff used has been saved from behind a stripper harvester or common stripper it is usually freer from straw. If quite clean, with a little molasses and bran or pollard added, it makes quite a good feed for cows without any hay chaff. The quantity for each cow would be 2 kerosene tins full twice a day.

Should the farmer have a corn crusher or grinder it would be less expensive for him to use crushed cereals instead of bran or pollard, as most farmers grow a few acres of oats or barley each year.

The Farm Shearing Shed.

[A. R. Lang, Morchard.]

Shearing is a job which should always be done away from horse yards, stables, or chaffhouses, as stable manure and chaff in wool is most detrimental. A shearing shed should always be handy to the drafting yards so as to save trouble in chasing sheep from one yard to another. A very suitable fence for yards adjoining a shed can be made from Cyclone netting with a rail along the top. Stringy bark, given a coating of tar, lasts a long time, and the weather does not appear to hurt it very much. It is always best to arrange that the sheep run up hill for yarding, if possible, as sheep will always run better uphill than down. Inside the shed battens or gratings should be provided for sheep to stand on, as wool is very easily damaged should a sheep lie down on a very wet and dirty floor. A farmer should always try and have enough shed room for at least one day's shearing in wet weather. If more farm sheds were a little more up-to-date we might be able to look for a reduction in shearing rates.

The catching pen adjoining the shearing board should always have battens running crossways to the shearing board, so that when the shearer pulls his sheep out the sheep cannot hook its feet into the battens. This makes it much easier for the shearer, and saves knocking the sheep about. The place on which the shearers stand should always be a boarded portion of the shed, and should be about 6ft. wide. It is also a mistake to have the catching pen too big, as the sheep and shearer are both knocked about catching the last few sheep in the pen. There should never be more than two shearers catching from the one pen.

The gates on the pens inside should slide along the rails of the pen, so that they can be opened and shut when the pens are full of sheep. Where gates are on hinges trouble is found in opening or closing them. The shearers must have a pen to let their shorn sheep into. Separate pens do away with tally disputes, and one cannot blame the other for roughly-shorn sheep. The letting-out pens should hold about 25 sheep, so that they will hold enough sheep for one run without turning out in the middle of a run. Then the sheep can be branded during lunch and dinner times.

It is essential that there be sufficient room in the shed for handling the wool, as it is almost impossible to manage with less than 3 wool presses and a rolling table, etc. Sliding doors should be fitted to a shearing shed wherever possible, as they do not have to be fastened, and sheep never push them open. A grinding stone should be close to the shed, as the shearers usually grind their shears every run.

Cereals for Coonalpyn.

[C. Allen, Coonalpyn.]

Malting Barley.

Let us take a farm in its raw state with the idea of developing it to the best advantage. Accepting the fact that the mallee has been rolled and burnt for immediate cropping, we are faced with the question of which cereal will give us the best return in grain and provide a good stubble that will ensure a running burn so as to make possible the hopes of a second good crop; for I think you will all agree that a good stubble burn is of almost equal value to a fair average first return.

The first cropping must of necessity be more or less roughly put in, and the more time one can gain for working it and be sure of a return from the last sowing, the more hope there is of a good return.

Barley meets this desire admirably, as the two following cases will prove. Mr. Cronin sowed barley in August and in November reaped 5 bags to the acre from it. About 4 years ago Mr. Todd Venning sowed 5 acres with Barley on 3rd October, and on the 1st January, reaped approximately 6 bags to the acre from it. These 2 instances show clearly the short time barley requires from seeding to the maturing stage, and yet yields a good return. Then, too, this quick maturing feature of malting barley will give it the advantage, if sown early, of maturing before an early summer or late spring dry spell can prevent it filling, thus making even more likely the assurance of a good return.

A third advantage arising from the early maturing quality of barley, is that we have more hopes, having practically the whole summer before us from which to select a good burning day; added to which is a fourth advantage of being able to reap the barley before the shoots get high enough to get into the comb of the reaper or harvester, thus avoiding that severe loss so often experienced with a first crop in the mallee country of dockage for "mullenised" grain. As regards the commercial value of the crop, the following table shows a fair average return of first year crops for wheat, oats and barley. Wheat, 7bush. per acre at 3s. 6d. per bushel, equals 24s. 6d.; malting barley, 10bush. per acre at 3s. per bushel, equals 30s.; oats, 12 bush. per acre at 2s. per bushel, equals 24s. Thus we find that from the actual crop return barley offers the best returns for our first crop.

What of the burning quality of the barley crop? This you will find superior to that of the wheat crop, it being a thicker crop and practically equal to that of the oat crop. It will be well sun dried, and once started, will give off a good heat, ensuring a good burn.

Then we have the advantage of feeding our barley and marketing it through pigs if the malting barley market fails, as we can provide small yards and sties for pigs; whereas we could not have the cleared sheep-proof paddock on which to run sheep if we were faced with the same problem with an oat crop. So then, we can sum up the advantages of malting barley:—(1) Early maturing quality, which permits of more working of the ground prior to sowing. (2) Greater hopes of good returns through maturing before a dry spell in late spring can check it. (3) Early maturity enables grain to be reaped before shoots grow high enough to "mullenise" grain. (4) A longer period from which to select a good burning day. (5) Higher commercial value per acre than wheat or oats. (6) Good stubble for a running burn, owing to the longer period after reaping allowing the sun to dry it. (7) More easily marketed through stock if direct commercial market fails.

Oats.

[E. J. D. Fox, Coonalpyn.]

Most of us still have some new land on hand. If the scrub is well rolled one is sure to get a fire over it that will clean up everything. It can be cultivated with a springtooth cultivator directly after it is burnt to prevent the ashes and top soil from blowing away; then if possible, cross it with the combine. Sow the oats before the first rain, using 1bush. of seed and 1cwt. of 45 per cent. super, and then harrow it. The returns from this crop would be in the vicinity of 6 bags to the acre, which, if crushed and fed to sheep at the rate of 2lbs. a day, would feed 2 sheep for 6 months with other grazing. They would return about 20lbs. of wool and two good lambs. Selling the wool at 15d. per lb. and the lambs at £1 each one would receive £3 5s. for the 6 bags of oats. The cost of planting would be (leaving out the cost of labour), approximately 2s. for rolling, 5s. for cultivating and combining, 1s. 3d. for harrowing, 2s. 6d. for harvesting, 2s. a bushel for seed, 3s. 9d. for super, and 8d. a bag to crush the grain before feeding, the total being £1 0s. 6d. That amount deducted from what was received for the grain would leave £2 4s. 6d. per acre, or 7s. 5d. per bag for the oats. The straw would carry a running fire which would scorch any shoots and kill many stumps.

In the second year plough the ground with a disc plough, then harrow it to help to level it and turn the loose stumps on top. The stumps should be picked and carted off. Then cultivate with a springtooth cultivator, and in a few days combine it (with the harrows behind the combine) using 1bush. of oats and 1cwt. of super.—or more if it can be afforded. This crop should produce very little less than the first, so we can expect a return of 5 bags, which if fed to the sheep in the same way would return approximately £2 14s. The cost of planting would be about 21s., one would receive £1 13s. per acre or 6s. 7d. a bag for the oats, and the fire that one would get would kill practically all the stumps. In the third year a crop of peas could be grown which, being a leguminous plant, would add an abundance of nitrogen to the soil. These could be harvested by the sheep, and the manure droppings from them would further enrich the soil.

In the fourth year sow another crop of oats, first ploughing the land with a disc plough and cultivating once or twice according to the weeds that come up. Combine in a bushel of seed and 1cwt. of super., then harrow. The returns from this crop would be much higher than the first, say 8 or 9 bags, which when fed to the sheep in the same way, would keep 3 sheep for 6 months with other grazing. These would produce about 30lbs. of wool and 3 good lambs. Selling the wool at 15d. and the lambs at £1 each would return £4 17s. 6d. The cost of planting and harvesting would be £1 6s., leaving £3 11s. 6d. an acre or 8s. a bag for the oats and labour. One would not only have received the profit from the oats but would have improved the value of the land from nil to £2 or £3 an acre, which certainly must be added to the value of the oats. Besides being fed to sheep the oats can be fed to cows to raise the milk and butter production, and to breeding sows, and they are also the best feed for horses.

Where one can grow 1bush. of wheat one can generally grow 3bush. of oats, and as this cannot be done with other cereals, oats must be the most profitable crop to grow in this district.

Pit Silage.

[L. S. Davie, Kybybolite.]

There is a deep-seated conviction among landholders that silage making is too costly or too difficult. Silage must be an important item in our farm management. With top-dressing and subterranean clover we can produce an exceedingly heavy growth of pasture, but are we utilizing it? There is a wrong direction of effort at the present time towards more and more mixed pastures, with a consequent neglect in dealing with what we already have. Pastures are perfectly balanced only when nearing the mature stage. Should not this be dealt with so as to provide as nearly as possible a balance throughout the year? I have proved the tremendous benefit to the health of stock through feeding silage during the dry summer months. Although good, green hay is also a balanced ration, one cannot get quite the same benefit from it, because it has not the same laxative qualities. However, it does provide an ideal necessary corrective for the the winter pastures.

The idea of hay alone filling the bill for fodder conservation must eventually be ruled out, because it is not practicable to save enough really good hay in the time available. Also, our ideas of the amount of stored fodder necessary must be extended, and the quality has to be improved. The only real way out is to develop silage storage to the utmost, in addition to hay.

Silage can be handled several weeks before hay is ready. It is not affected by rain falling on it. It is soft and smooth to handle, much more pleasant to deal with than hay, except in weight. I have endeavoured to minimise the exertion and cost of handling silage by means of a special type of pit.

It is very easy to make silage with our clover pastures. The material naturally sets together well, and air is excluded with a minimum of tramping. Silage made in overhead silos means a considerable outlay with costly handling. Stacks need no capital outlay, apart from a hoist, and reduce somewhat the cost of handling by being built on the land where the material is grown. A silage pit means capital outlay somewhat similar to an overhead silo, but when it is made in undulating or slightly hilly country, working costs can be reduced and the work greatly lightened. I have utilised the idea of the hillside pit, which is a hole cut into the side of a hill and which can be filled from the top, the silage being removed from the bottom. As we have no actual hills, I have made a pit with a drain leading away from it, utilising the earth from these to build the sides and one end, in order to give a reasonable depth and still retain the advantages of the hillside pit. The land where the pit is situated has a fall of only 6ft. in 300ft. The pit is 90ft. long, 20ft. wide at top, 17ft. 6in. at bottom and 10ft. deep. The lower end is open and can be driven into, and from it a drain 210ft. in length takes all moisture from the pit. The earth was scooped out to a depth of 6ft. The earth taken out was placed at the sides to make a total depth of 10ft., sloping it all round in order to make an easy grade from the ground level to the edge of the pit. The easy grade was necessary as the material is brought to the edge of the pit by means of the push-rake. To hold the built-up earth, posts were placed along the sides of the pit 15ft. apart and the earth timbered up with tree trunks. Sawn timbers would be better; while in the ideal pit the sides would be of concrete. The posts lean slightly outwards in order to conform to the slope of the excavated portion of the wall, which is not timbered. Between each pair of posts 20ft. timbers cross the pit and are let into the top of each post, thus preventing the posts from sagging inwards.

To pick up the silage the push-rake must be run in the same direction as the mower was working, picking up 3cwts. of the mown material each time. If the push-rake is found to pick up more than 3cwts. at a time it is best to take off the outside tooth from each side of the rake. The job can be managed by two men and a boy. If necessary two men can carry on at a slightly slower rate, as it would be necessary to stop for tramping occasionally. In filling, building in 15ft. sections makes for ease of handling when feeding out. The rear section must always be kept higher than the one in front of it, so that the edges do not become interlocked. Each section can then be used without any cutting having to be done. It will be seen that both in filling and emptying practically all the pitching is down ward, so that besides requiring a minimum of hands this type of pit lightens the work considerably.

The cost of ensiling a crop in this way would be approximately the same as in baling the same crop as hay, but the feeding value of the silage is much greater than that of hay. In making the silage, each section should be built up fairly level and tramped well. It will be found necessary to have more than one section going at once, as after filling up a section one can proceed with the next, and then return to the first while the other settles. It will be necessary to build to a height several feet above the ground at least twice, if a full pit of silage is required. Then weigh it down in the most convenient way.

Silage is not a subject of popular interest as yet. It is generally considered more or less impracticable, but its real practical value is so evident to those who use it that there is no doubt that it will gain a definite place in our farm practice. Silage can be held for any number of years as a reserve for exceptionally bad times. It needs no insurance from fire, water, or pests.

Fencing.

[K. H. Gillen, Yadnarie.]

A great deal depends on the timber available for posts. In some districts posts of good quality are not plentiful, and farmers requiring good posts have to get them from many miles distant, the result being that a fence cannot be erected cheaply. Many years ago posts were usually placed in a fence about 3 yards apart, but at the present time they are placed—in some extreme cases—as far as 1 chain apart.

Before erecting a good sound post or one that is subject to white ant damage, it is a good plan to char about 2ft. 6in. at the bottom. This has been proved to be a satisfactory cure for this pest. Posts should also be barked before being placed in the ground. The average height for posts in ordinary fences is 3ft. 10in. and they should be 2ft. below the ground. When sinking post holes it is advisable not to make the holes too large, as this means extra labour and also difficulty in getting the posts tight.

The most substantial boundary fence, and the one best suited for this country is one with posts placed about 5 yards apart, with 2 barbed wires and netting. The reason for placing netting in this type of fence is to prevent vermin from straying on one's property, which trouble has been prevalent in the past on the majority of farms in the Mallee areas.

A subdivision fence need not require so many posts. Posts could be placed 10 yards apart with 4 wooden droppers between each post Wooden droppers seem to be most suitable for these fences. Iron standards bend too easily, causing a considerable amount of trouble with wires breaking and the fence moving out of line. To complete this fence 1 barbed and 5 plain wires are necessary. It is also a good plan to saw the top of all posts. Not only does it give a better appearance, but the barbed-wire can be placed on the top of the post.

It is advisable to use separate posts when erecting gates, so that they will not interfere with the fence and will prevent posts and wires from loosening. The average height for all strainers and gate posts is about 4ft. 6in., with 3ft. below the ground.

Fences surrounding horse or cow yards are more substantial if they are erected with posts about 4ft. 6in. in height and 3 rails. This is all that is required to make a good sound yard in the event of one owning stock which have to be kept under control. It is also safer than barbed-wire, as it prevents stock from injuring themselves.

When settling on a new block it is a good proposition, if beginning to erect fences, to make a race or more, as the case may be. This will, no doubt, mean extra expense in material, but it is much easier in handling stock.

Strainers should always have a strut placed against them to prevent the fence from becoming loose. It should be placed about 2ft. from the top. If it is too high up on the strainer it will lift the strainer out of the ground

The most suitable time to erect a fence is when the ground is reasonably soft. It, of course, means less labour in sinking post holes; also the posts will keep tight much longer.

Good fences, in many instances, have been totally destroyed, either by fire, through scrub being too close, or else by becoming drifted up with sand. Care, therefore, should be taken in these two respects.

Breeds of Cattle Suitable to the District.

[H. C. Brook, Hartley.]

The Jersey being a cream producer is not wholly suited to this district, because if the winter is at all severe they depreciate very much in milk production Although Jerseys produce a lot of cream (or rather it is generally thought so) it would be a better paying proposition to the ordinary dairyman (*i.e.*, the man who does not look to breeding anything for show purposes), to cross his Jersey cows with a Shorthorn or Friesian bull. Either of these crosses produces a calf which will sell to the butcher (for size and colour) more readily and at a higher price than a Jersey Within the next few years, the Guernsey will almost wholly replace (except perhaps with stud breeders) the Jersey in such districts as this, on account of their bigger frame and heavier milk production, with practically as high a test as most Jerseys.

The Shorthorn is a very good dual-purpose animal, which is a good doer in nearly any part of the State. This breed makes a good cross with any other breed because they are one of the heaviest cattle for beef. Thirty years ago or more the Friesian was thought to be an unsuitable breed for this district, owing to the often-heard fallacy "they eat too much." I will endeavour to explain this erroneous idea. For four months—through the winter—I milked 30 to 35 Jersey cows. They produced about 60galls. of milk a day and 5galls. of cream. They were fed twice a day on chaff and crushed oats. During the same period 10 Friesian cows produced 32galls. of milk and 2galls. of cream a day. These cows were not fed on chaff, &c. At a first glance we would think that the Jerseys were well ahead. Take the same proportions for a week and we find:—

The Jerseys: 60galls. milk per day=420 galls. milk per week; 5galls. cream per day = 35galls. cream per week.

The Friesian: 32galls. milk per day = 224galls. milk per week; 2galls. cream per day = 14galls. cream per week.

Taking the same number of Friesians as Jerseys we would find the Friesians produced more cream and nearly double the amount of milk (672galls.). The Jerseys had on top of this to be hand fed, which had to be taken out of the produce. The extra milk produced would feed several more pigs or calves. Taking everything into consideration, heavier breeds will return more than double the production and income of the Jersey, which means that less animals have to be kept and fed for the same income.

Most people do not mind the colour or breed of their cows, because they are only interested in the production and income from them. With cross-breeding, the bull should be of the heavier type and so give colour and size to the progeny.

Constructing a Reinforced Concrete Trough.

[V. R. Dodd, Brimpton Lake.]

A trough is a necessity on a farm, especially where the water supply is from wells or tanks, and it should be well made. There is only one way of making a good job, and that is by using reinforced concrete.

By placing the trough on a line with a fence it can be made to water two or more paddocks. A useful-sized trough could be made 12ft. x 4ft., and to hold water 1ft. deep. By placing a rail around the top 1ft. from the top of the wall the trough can be used to water horses, cattle and sheep as well, as the sheep can put their heads through under the rail to drink.

First obtain cement, sand, and crushed stone or stone rubble, similar to ironstone rubble, but with the earth sifted out. It is important that the sand should be clean; if dirt is present it will spoil the job. The quantity of material depends on the size of the job.

Concrete has to be built in a mould. Obtain 2 planks 13ft. x 15in., and 2 5ft. x 15in.; also 2 planks 12ft. x 12in., and 2 planks 4ft. x 12in. Then dig out the earth where the trough is to be built 3in. deep and 15ft. 6in. x 5ft. 6in. to put in the foundation. It is a good plan to put down 6 planks about 8ft. x 1ft. on the ground, on which to mix the concrete, as it keeps the material clean, and it is easier to mix concrete on a foundation. Concrete should be mixed in the proportion of 1 part cement, 2 sand, 3 crushed stone, and it should not be so wet as to run out of the mould.

Fill in the foundation with concrete to a depth of 3in.; then put the outside mould together, and place it on top of the foundation, so as to leave 3in. of concrete outside. Then get some ⅜in. mild steel bars and cut them into 6ft. 2in. lengths, and bend them U shape, so they reach across the bottom with one end up through each wall; 11 pieces are used, spacing them 1ft. apart. Then cut 3 pieces 14ft. 2in. long, and place them along the bottom. Then stand the rods up; put a length of fencing wire along them, and tie them on with tie wire; that will hold them in place. Then put a few more pieces of wire along the bottom, and put in 3 more inches of concrete to finish the floor. It must be well rammed, and the best thing to use is a rod with a flat end, like a spade. Have the floor level, and then assemble the inside mould, and place it in position, leaving space for a 6in. wall, with the steel rods in the centre of the wall. Proceed to fill in the walls with concrete, being sure to ram them down firmly. At every 3in. or so put a strand of good fencing wire around on the outside of the steel, and hook the ends together. Fill in until the top of the frame is reached.

Put some bolts in the wall at one end, so that they are higher than the top of the wall. These will serve to fasten a cover for the ball tap. The rail is best made of 1in. piping. It should be cut in lengths corresponding to the walls and screwed together at the ends with elbows. The rail should be supported 1ft. from the top of the wall by standards placed in the centre of the walls, and the rail clamped to the top of these. Three standards on each side and 1 at each end should be enough.

After the concrete has set for 12 hours take off the moulds, plaster the trough inside and outside with cement, and cover with wet bags until it has set fairly well. Then put in enough water to cover the bottom, and in 2 or 3 days it will be ready to be filled. When properly set it will be unbreakable.

Activities of Women's Branches

The Annual Congress.

Delegates from Women's Branches of the Agricultural Bureau attended the official opening of the 47th Annual Congress in the Way Hall on Monday, 7th September, and held their subsequent sessions in the Women's Non-Party Rooms, Alexandra Chambers, Adelaide. Mrs. J. S. Hammatt (Williamstown) presided.

The following papers, published in the September issue of the *Journal of Agriculture*, pages 203 to 210, were read and discussed:—“City *versus* Country Life,” Mrs. J. Foggo (O'Loughlin); “Fancy Work,” Miss A. Marks (Penola); “Soaps and Cleansers,” Mrs. J. Pengilly (Wilmington); “Butter-making in Small Quantities,” Mrs. W. Varcoe (Millicent); “Sheepskin Tanning and Washing,” Miss I. Todd (Coonalpyn); “Dried Fruits,” Mrs. R. Jarvis (Warcowie); and “Nursing and Health,” Mrs. M. Reynolds (Narridy).

The Agenda was augmented by the following demonstrations and addresses:—Mr. A. E. Ophel (Inspector of Apiaries) spoke on “Bee Keeping”; an address and demonstration of “First Aid to the Injured” was given by Mrs. B. Williams, of the St. John's Ambulance Brigade; “Furnishings for the Kitchen and Laundry” were shown and explained by Mr. T. Newton, of Clarkson Limited; and Miss O'Connell, of the Bon Marche, Hyde Park, gave a practical demonstration of “Dressmaking.”

Trips to places outside the city included a visit to the Botanic Gardens, Parafield Poultry Station, and the Waite Research Institute.

During the session devoted to Free Parliament, it was resolved:—“That this Congress would like to see more space devoted to the reports of women's activities in the *Journal of Agriculture*, or, as an alternative, to have a supplement;” “That a lady instructor be appointed on the Advisory Board of Agriculture”; “That first-aid be taught in our out-back schools”; “That a Government dentist be sent to Eyre's Peninsula periodically, or otherwise arrange for a local dentist to visit schools regularly”; “That the freight on perishable goods by train on Eyre's Peninsula be reduced”; “That the Baby Health Centre be approached with a request that the Baby Health Train travel on the line to Barmera”; “That motor taxes on Eyre's Peninsula be reduced.”

DELEGATES.

The following Branches appointed delegates, and the figures indicate the number of sessions for which attendances of delegates were recorded:—*Auburn*—Miss Dennison (4), Mrs. H. Kench (4). *Balumbah*—Mrs. S. Wohling (5), Miss H. Jericho (5). *Beetaloo Valley*—Miss H. Chandler (5), Miss M. Ryan (4). *Belalie*—Mrs. M. Bailey (5), Mrs. E. L. Orchard (5). *Boor's Plains*—Mrs. N. Cross (3), Mrs. H. Queale (3). *Clare*—Mrs. A. Blight (5), Mrs. R. Michael (4). *Coonalpyn*—Miss E. George (5), Miss B. Todd (5). *Coonawarra*—Mrs. H. Reschke (5), Miss O. Lear (5). *Devlin's Pound*—Mrs. C. Smith (5), Mrs. G. Chesney (5). *Echunga*—Mrs. G. Edmonds (4), Mrs. McDonald (4). *Eurelia*—Mrs. E. Dowd (4), Mrs. E. Clendinnen (4). *Georgetown*—Mrs. W. McNamara (3), Mrs. R. McDonald (5). *Gladstone*—Mrs. L. G. Harris (4), Mrs. R. Lines (5). *Hope Forest*—Mrs. Fincher (3), Miss E. DeCaux (3).

Kalangadoo—Mrs. H. Brooks (4), Mrs. J. Hunt (4). *Kangarilla*—Mrs. J. White (4), Mrs. C. Steer (4). *Karte*—Mrs. F. Atze (4), Miss Trowbridge (5). *Koolunga*—Mrs. F. Perrin (3), Mrs. C. Buchanan (3). *Kybybolite*—Mrs. H. Naylor (3), Mrs. L. Cook (3). *Laura Bay*—Mrs. W. Bowell (5), Miss L. Blumson (5). *Lobethal*—Mrs. W. Slade (3), Mrs. T. Lutz (3). *Maltee*—Miss R. Talbot (4), Mrs. J. Bassham (5). *Mangalo*—Mrs. P. Cleave (3), Mrs. F. Coles (3). *McLaren Flat*—Mrs. K. Warren (4), Miss F. Bell (3). *Millicent*—Miss K. Hutchesson (5), Miss I. Fensom (4). *Monarto South*—Mrs. T. Bretag (4), Miss F. Aesche (4). *Morchard*—Mrs. A. Schulz (4), Mrs. H. Brown (5). *Mudamuckla*—Mrs. A. Watson (5), Mrs. B. Flaherty (4). *Mundalla*—Mrs. W. Dinning (5), Mrs. H. Jones (5). *Narridy*—Miss V. Roberts (3), Miss K. Mannix (3). *Nelshaby*—Mrs. F. Jose (5), Mrs. H. Noll (4). *O'Loughlin*—Mrs. J. Foggo (4), Mrs. E. Lutz (4). *Parilla*—Mrs. H. Colwill (5), Miss J. Carman (3). *Parilla Well*—Mrs. M. Davis (4), Mrs. A. Napper (3). *Parrakie*—Mrs. D. Murdoch (5), Miss J. Halliday (5). *Penola*—Miss A. Marks (5), Mrs. F. Kidman (5). *Pinbong*—Mrs. C. Scholz (5), Mrs. N. George (5). *Pinnaroo*—Mrs. P. Dowd (4), Mrs. G. Nickolls (5). *Pygery*—Mrs. M. Heath (5), Mrs. M. Duggin (4). *Rendelsham*—Mrs. E. Inns (3), Miss M. McArthur (4). *Saddleworth*—Mrs. J. Garrett (5), Miss G. Frost (4). *Smithville*—Mrs. W. Hodges (3), Mrs. D. Day (3). *Sheoak Log*—Mrs. V. Bowden (4), Mrs. E. Koch (5). *Snowtown*—Mrs. A. Hocking (5), Mrs. N. McDonald (4). *Strathalbyn*—Mrs. A. Deer (5), Mrs. C. Hudd (5). *Tantanoola*—Mrs. G. Altschwager (4), Mrs. D. Considine (4). *Taplan*—Mrs. R. Clarke (5), Mrs. R. Flynn (5). *Warcowie*—Mrs. A. Crossman (5), Miss H. Telfer (5). *Warramboo*—Miss E. Steer (5), Mrs. F. Chilman (5). *Wasleys*—Mrs. A. Wilson (4), Miss K. Harding (5). *Wepowie*—Mrs. M. Ware (3). *Wilkawatt*—Mrs. P. Thompson (4), Miss D. Pritchard (4). *Williamstown*—Mrs. J. S. Hammatt (5). *Wilmington*—Mrs. J. Pengilly (5), Mrs. L. Cole (5). *Wirrabara*—Mrs. A. Watt (5), Mrs. C. Jaeschke (5). *Wirrilla*—Mrs. H. Schunke (3). *Yurgo*—Mrs. L. Hopgood (4), Mrs. H. Kelly (5).

NEW BRANCH AT ALAWOONA.

During the afternoon of the Alawoona Conference, a special session, sponsored by the Taplan Women's Branch, was held to give the ladies of the Alawoona district the opportunity of seeing something of the work of Women's Branches of the Agricultural Bureau, and Mrs. Stewart presided.

Papers were read by Mrs. Clarke and Mrs. Stewart, and the remaining portion of the session took the form of a Question Box. Mr. Richards gave a brief outline of the work of the Bureau, this being supplemented by Mrs. Stewart.

Subsequently it was unanimously decided to form a Women's Branch at Alawoona, the following ladies being enrolled as foundation members:—Mesdames H. J. Koch, T. B. Flint, J. T. Patrick, T. M. Jeffrey, W. H. Cooper, H. G. Pomery, A. G. Patterson, F. J. Wright, H. Hartley, M. L. Smith, A. Thomson, and Miss C. Masters. The following officers were elected:—President—Mrs. T. B. Flint; Vice-President—Mrs. Jeffrey; Secretary—Mrs. Cooper. In addition to the foregoing officers, Mesdames Koch, Wright, and Hartley were appointed as members of the Committee.

NEW BRANCH AT WILLOWIE.

The first meeting of the Willowie Women's Branch of the Agricultural Bureau was held on 19th October, 1936. Mr. F. C. Richards (Assistant Secretary of the Agricultural Bureau) addressed the meeting, and the following ladies were enrolled as foundation members:—Mrs. L. N. Mills, Mrs. E. C. Foulis, Mrs. H. T. Hughes, Mrs. Rex Jared, Mrs. W. P. Foulis, Mrs. A. Crisp, Mrs. S. T. McCallum, Miss R. McCallum, Miss E. E. Batten, Mrs. H. K. Gunn, Miss G. Gunn, Miss M. Mountford.

Election of Officers.—President—Mrs. L. N. Mills; Vice-Presidents—Mrs. W. P. Foulis and Mrs. S. McCallum; Secretary—Mrs. E. C. Foulis. In addition to the foregoing officers, Mesdames H. T. Hughes and H. K. Gunn were appointed members of the Committee. The Branch will go into recess for December and January, and the dates of future meetings will be decided when the Committees of both the Men's and Women's Branches meet and decide on a convenient date.

AUBURN.

The meeting of 25th September was held at the residence of the Secretary, Miss L. Dennison, and was attended by 18 members. Three new members were proposed. Mrs. Kench and the Secretary gave reports of the Adelaide Congress.

BALUMBAH.

The meeting of 4th October was attended by 14 members and visitors, and was held at the residence of Mrs. A. Swann. Reports of the Congress delegates were read and discussed. A social gathering was then held in conjunction with the Men's Branch. (Secretary, Miss H. Jericho.)

BOOR'S PLAINS.

In the absence of the President, Mrs. G. Rodda presided over the meeting held on 31st August at the residence of Mrs. A. Adams, 15 members being present. Miss V. Ward read an instructive paper, "Knitting." (Secretary, Miss L. Stanway.)

Mrs. Cross presided over an attendance of 12 members at the annual meeting, held on 7th October. The election of officers resulted as follows:—President, Mrs. N. J. Cross; vice-president, Mrs. T. A. Stanway; secretary, Miss L. Stanway; committee, Mrs. M. D. Wright and Mrs. T. Rodda, with other officers. The ladies entertained members of the Men's Branch and delegates from surrounding Branches, who attended the Annual Field Day.

COONALPYN.

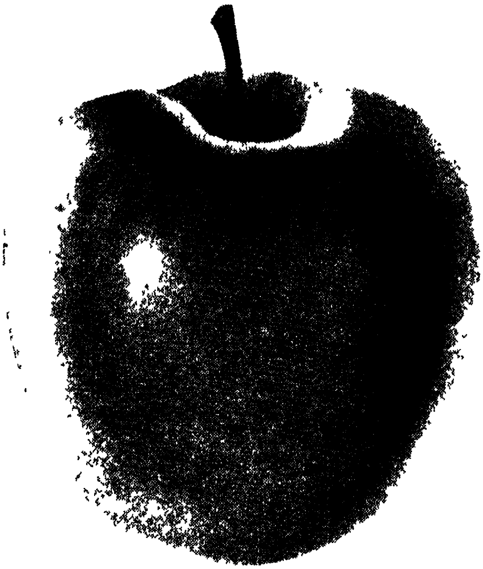
Mrs. Fox occupied the chair at the meeting held on 30th September. Detailed reports of the Annual Congress were given by the delegates. (Secretary, Miss E. George.)

COONAWARRA.

Apples and Their Uses.

Mrs. H. Reschke read the following paper at the September meeting, which was attended by 25 members:—In a district where apples are grown extensively and where there is often a good deal of waste fruit the surplus fruit should be preserved. If this is done, it means that fruit will be available in winter. Apples are the best fruit grown for household use; they last for months when sound ones are stored in any cool, dry place in the home.

As good apples possess valuable properties their value cannot be over estimated. As a general rule, they are so cheap—especially those rejected for export and market use—that they are within reach of all householders within many miles of the districts where they are grown. On most farm homesteads a small orchard is usually grown for household purposes, and apple trees are always among the varieties grown.



The careful housewife makes the best possible use of all apples. She uses up first the ones that will not keep any length of time—such as windfalls, those that fall through the ravages of Codling Moth, or that are damaged in any way to spoil their keeping capacity—taking care later on as the correct picking time comes to pack and store away the good ones for later use. The following are a few ways that apples can be used in the home:—Pick up from under the trees the fruits as they fall; peel, core, and pulp them, and fill large Fowler's preserving bottles with the pulp. Place them in the steriliser, and sterilise in the usual way to vacuum the lids. This is very convenient for making pies and tarts during winter. Apples and quinces peeled, cored, mixed in bottles, and preserved are excellent for pies. Apple pie from the fresh fruit that would otherwise be wasted is also excellent.

RECIPES.

Roly-Poly.—2 cups S.R. flour, 1 cup butter or dripping. Rub into flour, and mix with water. Roll out, and spread with the following:—3 apples peeled and grated, ¼ cup sugar, good ½ cup sultanas, and a little chopped lemon peel (preserved). Sprinkle well with cinnamon, and roll up and place in large pie dish. Dissolve ½ cup sugar and 2 tablespoons butter in 2 cups of boiling water, and pour over the roly-poly, and bake until brown.

Apple Ferguson.—2ozs. butter, 3 cups breadcrumbs, 3 large apples peeled and grated, 1 cup each sultanas and sugar, grated rind, and juice of 1 lemon, ½ grated nutmeg, 3 eggs well beaten, then add 1 large teaspoon carb. soda. Method.—Rub butter into breadcrumbs, add other dry ingredients, lastly eggs and soda. Mix well, put in buttered basin, and steam 3 hours. Serve with whipped cream or custard sauce.

Useful when Apples are Scarce (Mrs. E. G. Allder).—Stew a few apples. Make pastry, place apples in dish on top of half the pastry, then add some currants, sultanas, and raisins, and a little grated nutmeg, also a handful of coconut. Cover with pastry and bake.

Apple Pulp (Mrs. Len Redman).—Weigh as many pounds of apples as required. Add 1 cup of water to every 1lb. of apples Boil well without sugar, then put ½lb. of sugar to every 1lb. of apples, and boil ½ hour. Put into jars, paste down as jam.

Dorset Pie (Mrs. W. L. Redman).—Nice hot or cold and economical. 1½ cups flour, ½ tsp. salt, 1 tsp. soda, 2tsps. cream of tartar. Sift these. Rub lightly in 1 tablespoon butter or dripping. Mix with milk to soft paste. Pat out to the thickness of ½in. Put in large cake tin, and bring edge of pastry slightly up along edge of tin. Peel and core apples, cut apples in eighths, and press down in paste as thickly as possible. Sprinkle over ½ cup sugar and 1 teaspoon cinnamon. Cook in a moderate oven ½ hour.

GLADSTONE.

The September meeting was held on the 22nd of the month. There was an excellent attendance of members. Sister Harslett read a paper, "Infectious Diseases." (Secretary, Mrs. L. Sargent.)

HOPE FOREST AND DINGABLEDINGA.

The meeting of 1st October was held at the residence of the President, Mrs. Jefferis. Lady Mawson gave an interesting address on "Baby Welfare," (Secretary, Miss M. De Caux.)

KANGARILLA.

The delegates who attended the Annual Congress reported on the proceedings of the Women's Sessions, and the Branch decided to visit the McLaren Flat Bureau on 19th November. (Secretary, Mrs. M. Steer.)

KARTE.

Hints for the Home.

Mrs. Trowbridge presided at the September meeting, which was held at Mrs. A. Gunn's residence; 17 members were present.

Mrs. M. Small gave the following paper:—"If a fowl is being prepared for the table, and it is known to be old, stuff and boil it for 2 or 3 hours, and then, when more tender, place the bird in the baking dish, with fat, to roast, breast downwards. Done in this way, the breast is not so dry, and does not require so much basting. With the preparatory boiling, stock will be available for soup, as well as the roast dinner. Add feet and giblets, with pearl barley and split peas, and boil up. This, served with small squares of dried toast, will be much appreciated."

When cucumbers are being cut up for salads it is hard to slice them fine enough, and make them nice for eating. Peel the cucumber and use the third size on the grater to cut it up. The job is done quickly, and the cucumber is cut in a more digestible way. If onion is to be added to the salad it can be done in the same way. The grater is useful when there is no meat and not too many eggs on hand to make a meal. Grate some potatoes and onions and bind them together with an egg and a little flour, pepper, &c.; salt to taste, and fry in boiling fat.

Sewing Hints.

What a lot of trouble it is to cut enough material on the cross to bind the bottom of a frock neatly? It is much easier to allow a little extra length when cutting out the frock, and then run around with the machine on the wrong side of the material, turning up about ¾in. and doing the machining on the edge. Then fold the raw edge back and stitch back to the machine edge. This looks just like the ordinary binding, and is much firmer than the usual way, which is apt to pull out if the work is done too near the edge.

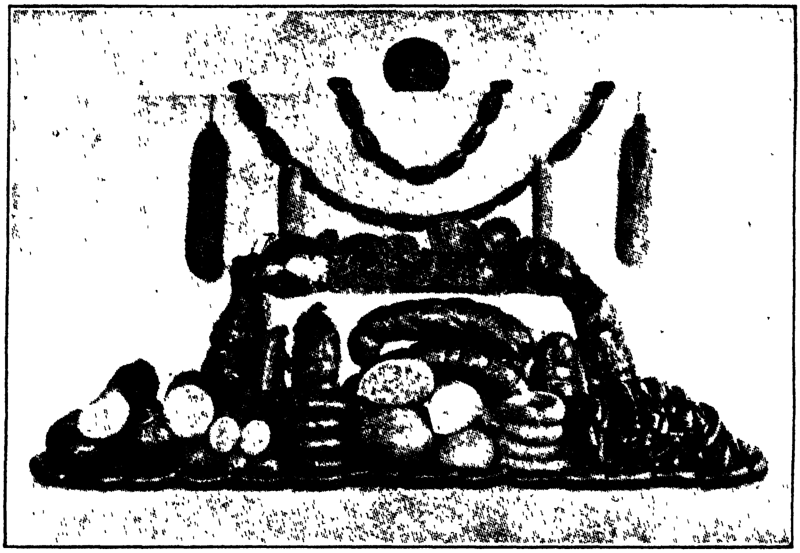
When sewing on a coat button that has to stand strain, it is a good plan to sew an old one on the back of the material; this will take some of the pull, and so save the material.

A window seat made with 3 kerosene cases and some cretonne can be used in the bedroom, under which the shoes, &c., can be kept. Stand 2 of the cases on end, opening to front, and nail the remaining one, turned on side, between them. The one in the middle can be left either as it is, and a shelf put in, similar to one standing on end, or made into a box and a hinged lid put on it. With the cretonne make small curtains and place in front of the shelves, &c., and cover the rest.

Sausage Making.

[Mrs. A. Mattschoss.]

On a farm, when a pig is killed, there is always a lot of waste, such as the head and odd scraps of meat too small for pickling. An economical way of using this is to make it into sausage, which provides an appetising dish for breakfast if fried and eaten with eggs, or it can be eaten cold in sandwiches. Catch some of the blood, which must be stirred until it is cold; then stand aside until next day. As soon as the pig is dressed, take the runners and cut them apart. Clean and trim them, and wash several times in warm water. Then wash them in salt and vinegar, rinsing in warm water, and let stand in salt and vinegar until next day. Take the head, clean it, cut in half; remove ears, eyes, and tongue, take out brains, wash well, and let stand in cold water overnight. Next morning put the liver and meat from the head in the copper to boil, adding the scraps of meat cut from shaping the hams, &c.



Sausages and Other Small Goods.

White Pudding.—Take the liver and a few pieces of fat pork, mince, and add seasoning, thyme, marjoram, pepper, salt. Add 2 small minced onions, mix well, and taste to see if it has enough seasoning. Fill in runners, tie up, and put in copper for 15 to 20 minutes, just keeping them off the boil.

Black Pudding.—Mince the meat of the head after cutting it off the bones, add seasoning, salt, pepper, thyme, marjoram, and a little ground allspice. Mix well, add the blood, mix thoroughly, and fill in runners. Tie up, and put in copper 15 to 20min. This sausage can be eaten fried or in sandwiches.

Rice Sausage.—Take some of the black pudding after it is seasoned, add boiled rice; mix well, and fill in runners or put in dishes, and bake in stove until done. This sausage is nice fried and eaten with eggs instead of bacon.

Metwurst.—30lbs. fresh pork, 11ozs. salt, 2ozs. black pepper, 4ozs. white pepper, 3ozs. saltpetre, and a little ground allspice. Mince the meat, add seasoning, and mix well, working it with the hands like kneading bread. Fill into butt ends, hang up for a day, then smoke. The meat for this sausage should be of the best, and free from blood. The two rolls of lean meat along the backbone are generally used.

Pork Sausages.—Mince 1½lbs. fresh pork; mix with 1 dessertspoon salt, 1 teaspoon pepper, pinch of mace, a little mixed herbs or sage. Soak ¼lb. bread, squeeze dry and mix, fill in runners, and twist like sausages from the butchers.

Brawn.—Take 4 trotters, clean well, put on to boil in cold water, simmer until the meat falls off the bones, take out bones, cutting up the meat, add salt, pepper, a little allspice and cloves, and enough vinegar to taste; pour into dishes to set. (Secretary, Mrs. F. Atze.)

KOOLUNGA.

With the excellent attendance of 36 members and 5 visitors the September meeting was held on the 24th day of the month. Vocal and musical items were rendered, and the members who had represented the Branch at the Annual Congress gave a detailed report of the various sessions. (Secretary, Mrs. C. Buchanan.)

KYBYBOLITE.

Mrs. H. B. Schinkel presided over an attendance of 16 members. Mrs. J. Heffernan had charge of the meeting, and read an instructive paper on "Breadmaking." She also spoke on the cultivation of chrysanthemums (Secretary, Mrs. W. Kekwick.)

LOBETHAL.

A meeting was held in the supper room of the Tweedvale Institute on 17th September, and took the form of a Social Evening and Question Box. Seven new members were added to the roll. Items were rendered by Mesdames Lutze and Brueggemann and Miss M. Mueller. A competition was arranged by Miss N. Camens, and was won by Miss M. Erdmann. Members provided supper, which was shared by the men, who held a meeting in the adjoining room. (Secretary, Miss W. Schapel.)

MALTEE.

Breakfast Dishes.

Mrs. H. J. Schwarz presided at the meeting held on 1st October. Miss D. Bassham gave the following recipes:—

Salmon Sauce.—Boil 2 cups milk with a little butter. When boiled, thicken with 2 tablesps. cornflour, pepper and salt made into paste, with 1 egg, and add 1 tin salmon. Serve on fried bread or buttered toast.

Curried Eggs.—6 or 8 eggs, 2 tablesps. milk, parsley or vegetable that has been boiled, and beat them together; put 1 tablesp. butter and 1 large teasp. curry powder, and place in frying pan to melt. When melted stir in egg mixture, and keep stirring occasionally until cooked. Serve on toast.

Cold Potato Patties.—Begin by mashing the cold potatoes together; add 1 or 2 eggs, according to quantity of potatoes, add pepper and herbs to flavour, and beat them all together. If too moist, add a little flour, and drop 1 tablesp. into boiling fat, and cook until set.

Omelette.—2 eggs, 2 tablesps. fine breadcrumbs, 2 tablesps. milk; cut up onion or parsley very fine, and add pepper and salt to taste; beat all ingredients together, and fry. (Secretary, Miss L. Schwarz.)

McLAREN FLAT.

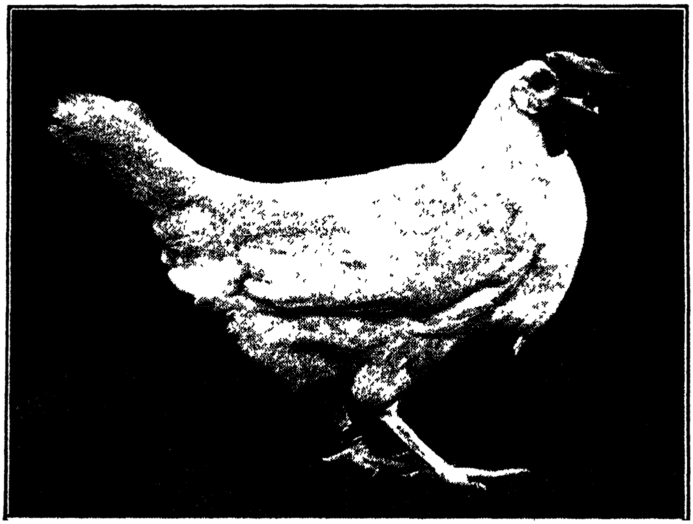
Mrs. B. Elliott gave a demonstration of arranging flowers for table decoration, for show work, and of posy making, and offered trophies for this work at the local spring show. The Branch also decided to offer a prize in the show to the member of a Bureau obtaining the highest aggregate points in the cooking section. One new member was enrolled. (Secretary, Miss F. Bell.)

MILLICENT.

The following hint for washing blankets was given by Mrs. Willshire at the meeting held on 18th September, which was attended by 10 members:—"Dissolve in boiling water ½ a bar of shredded Witch soap, 3 tablespoons cloudy ammonia, and 2 handfuls of borax. Shake the blankets, and put in cold water, then add the above mixture. Soak all day and night, and occasionally knead the blankets. In the morning wring out the blankets, and rinse them in two lots of clean water. The preparation suggested above is sufficient for 6 blankets done in 2 tubs." (Secretary, Mrs. M. Hutchesson.)

MYPONGA.

Poultry Raising.



At the meeting held on 24th September Mrs. E. Baxter in the course of a paper said worked on methodical and sound lines the raising of chickens could be a profitable and interesting sideline of the farm's activities. Good eggs were essential, and to obtain these the hens must be procured from a reliable strain. She recommended the White Leghorn and Rhode Island Red breeds. These should be mated to a 1-year-old cockerel, allowing 1 male bird to each 12 hens. After the birds had been shut up for 10 days the eggs could be saved, and all those of normal shape and weighing at least 1¾ozs. used for setting. The third week in August was recommended as the time for putting in the eggs for hatching. The chicks would then come out when the weather was not too cold, and they would usually moult before commencing to lay. The incubator was preferred for hatching, because of the regularity with which the chicks came out, and because of the trouble one had in getting broodies. If no brooder was available, a large box with a bag in the bottom would make a temporary brooder, which should be cleaned out every morning. The paper then read as follows:—"Then get pieces of deal the width of the box and about 2in. wide, and tack pieces of blanket or flannel on it, and let them hang down just over the chickens. Tear them up about 2in., and thread feathers through it. This will serve as a good mother, and keep the chicks warm. On sunny days put them in a run about 8ft. x 3ft. made of wirenetting, and in one end place a few of these brooders with the blanket on them. When the sun goes under the clouds the chicks will shelter under the covering.

Feeding.

"Feed Chick Vital, which can be purchased in 7lb. bags. The chick feeder is very useful, because chickens cannot waste the feed. Give plenty of fresh water. Always put the run on a nice patch of grass. Chickens are very fond of scratching and picking at greenfeed. When a few weeks old, separate the sexes, and put the cockerels in a run by themselves. At 6 months the pullets should be starting to lay. Always have plenty of shell grit. When chickens are about 3 weeks old they can be given wheat in place of the Chick Vital." (Secretary, Mrs. M. Bounds.)

MORCHARD.

The delegates' report of the Annual Congress was received and discussed at the meeting held on 23rd September, which was attended by 10 members and 2 visitors. (Secretary, Miss F. Brown.)

MUDAMUCKLA.

Consideration was given to the resolutions set down for discussion at the Adelaide Congress at the meeting of the Branch held on 1st September. The meeting then took the form of a "Question Box." (Secretary, Mrs. A. J. Kulmann.)

PARRAKIE.

Mrs. Cabot and Miss J. Halliday were elected unopposed as President and Secretary respectively at the meeting of the Branch held on 23rd September; 18 members and 2 visitors were present.

PINBONG.

Meeting held 29th September at the residence of Mrs. H. B. Scholz. Present: 11 members. Mrs. C. H. Scholz gave a report on the Adelaide Congress, and Mrs. N. O. George read a paper on "Butter Making." Mrs. H. B. Scholz gave a sponge cake demonstration. Members decided to hold a Centenary picnic during October, and to invite the Pygery Bureau members. (Secretary, Miss D. Scholz.)

PINNAROO.

Mrs. P. Dowd presided at the meeting held on 2nd October at the residence of Mrs. J. Webster; 17 members were present. In recognition of the excellent work performed by Mrs. W. Davis for the Branch, members presented her with a crystal vase. The reports of the delegates to the recent Congress were received and discussed. (Secretary, Mrs. Wirth.)

SADDLEWORTH.

The Secretary of the Branch reports that members always look forward to the Homestead Meetings which from time to time are included on the programme. For the month of September the meeting was held at Mrs. H. Behn's homestead. Mrs. Garrett and the Secretary (Miss Frost) represented the Branch at the Annual Congress, and gave excellent reports of the special sessions arranged for Women's Branches.

WARRAMBOO.

The September meeting was held on the 25th of the month, and was attended by 12 members and the Secretary, Miss E. Steer. A full report was given by the delegates who attended the Adelaide Congress.

WASLEYS.

The meeting was attended by 56 members, and took the form of a Flower Show, for which 60 entries were received. Mr. and Mrs. P. H. Gwynne, of Gawler, acted as adjudicators. Prizes were won by the following:—Posies, Miss G. George; vase 6 roses, Mrs. H. G. Hancock; 6 gladioli, bowl of mixed flowers, and table decorations, Mrs. J. Hancock. A talk on "Gardening" was given by Mrs. Sanders, and a paper on "Gardening," written by Mrs. E. George, was read by the Secretary (Miss K. Harding).

WIRRABARA.

Seventeen members attended the meeting held on 22nd September, when Mrs. Watt occupied the chair. The President and Mrs. Jaeschke gave a report of the Annual Congress. (Secretary, Mrs. Harding.)

YANDIAH.

Ten members attended the meeting held on 18th September at the residence of Mrs. H. Neale. Each member read a recipe, which included biscuits, cake, sandwiches, and mayonnaise, and brought a sample of same. (Secretary, Miss V. Keller.)

HOUSEHOLD INQUIRIES.

[Replies supplied by Miss E. Campbell, Inspector of Domestic Arts, Education Department.]

Mould on Jam.

Lameroo asks: "What is the cause of mould on melon and quince jams after the jars have been sealed down?"

Reply—The mould spores are in the air, thus if the jam had been sealed whilst hot, the steam rising would have prevented the air reaching the jam. Apricot and quince jams very frequently become mouldy. The fruit used for these jams should be only just ripe, and the jam should not be the least watery when finished, otherwise it is sure to provide good growing foundation for mould.

Chewing Gum on Clothes.

Kybybolite Branch asks: "What will remove chewing gum from a serge suit?"

Reply—The chewing gum must be hardened by the application of ice or very cold water, then as much as possible scraped off. The remainder can be removed with benzine—adopting the regular method of removing spots, *i.e.*, have a clean padded cloth under the spot, and work from the outside towards the centre of the spot. The success lies in removing most of the gum before applying the benzine.

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JOURNAL
OF THE
Department of Agriculture
OF
South Australia

VOL. XL. DECEMBER, 1936 No. 5

Published Monthly by the Department of Agriculture Edited by H. C. PRITCHARD

Page
Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836-1936 393-403
Prickly Pear Eradication 404-410
The Removal of Spray Residue from Apples and Pears 411-417
Tubercle-Free Herd Scheme 418
Modern Methods of Incubation 419-434
Dipping Bath for Horses 434-435
Reworking Fruit Trees 436-439
Feeding Tests at Parafield Poultry Station 439
Egg-Laying Competitions 440-441
Results of Wheat Crop Competitions, 1935-36 442-448
Seed Wheat from Crop Competitions, 1936-37.. 449-450
Herd Testing Results 452
Rainfall Table 453-454
Bureau Reports 455-466

WOMEN'S BRANCHES.

Bureau Reports 467-474

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1937

River Murray (Swamps), at Wood's Point, Thursday, 18th February (Mr. F. P. Baily).

Lower North, at Wasleys, Thursday, 25th February (Mr. Elliot Day).

Mid-North, at Koolunga, Thursday, 11th March (Mr. J. W. Sykes, Koolunga).

Yorke Peninsula, at Stansbury, Wednesday, 24th March (Mr. H. W. Cornish).

South-East (Lower), at Coonawarra, Wednesday, 14th April (Mr. John M. Kain).

Dairying, at Lobethal, Thursday, 13th May (Mr. B. Schapel).

River Murray, at Waikerie, Thursday, 17th June (Mr. F. B. Harden).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.					
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	
	Dec. s. d.	Dec. s. d.	Nov.-Dec. s. d.	Jan.-Feb. s. d.	Nov.-Dec. s. d.	
Nov. 4..	5 0¾	4 11¼	4 11½	4 7⅛	4 11¼	Parcel, 7,500 tons Australian wheat (Jan.-Feb.) from all ports resold 4s. 7⅜d. Parcel, 500 tons South Australian wheat (afloat) sold 4s. 11¼d. Parcel, 35,000 tons Plate wheat (Jan.-Feb.) sold direct to Italy, price not disclosed.
Nov. 12..	5 0	4 10⅛	4 11½	4 7⅜	4 10⅛	Parcel, 500 tons New South Wales wheat shipped Liverpool (afloat) sold 4s. 11⅜d. Parcel, 500 tons South Australian wheat (arrived Manchester) sold 4s. 11⅜d.
Nov. 19..	5 0	4 10⅛	5 0	4 7¾	4 10⅞	—
Nov. 26..	5 0	4 10⅛	4 11⅛	4 7½	4 10⅞	New South Wales—Parcel, 4,000 tons (afloat) resold at 4s. 11⅜d. South Australia—Parcel, 8,250 tons sold at 4s. 10⅛d.
Dec. 3..	5 4½	Jan. 5 3	Dec.-Jan. 5 3⅜	4 10⅞	Dec.-Jan. 5 3	South Australia—Parcel 4,700 tons for January shipment was sold at 5s. 2⅜d.

Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By Arthur J. Perkins, sometime Director of Agriculture in South Australia, Principal Roseworthy Agricultural College, &c.]

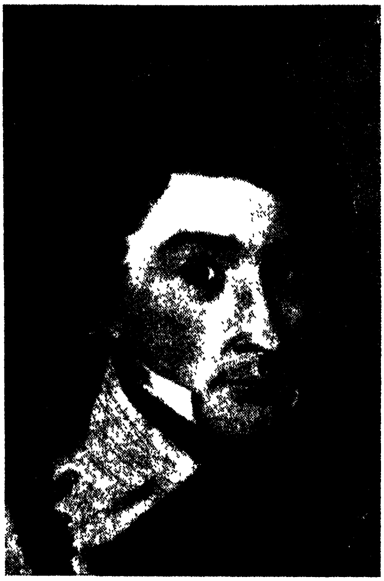
CHAPTER I.

Departure of the Emigrant Fleet—Political Conditions in Great Britain and Europe that influenced Colonisation—The Wakefield Principles of Colonisation—The First South Australian Act—Difficult Financial Clauses—Resignation of First Board—Difficulties of Financial Clauses overcome by Second Board—Appointment of First Governor and Officials—Shortcomings of Officials—Proclamation of Colony—Selection of Site of Adelaide.

Capt. John Hindmarsh, R.N., First Governor of South Australia, 1836-1838. (*By courtesy of Archives.*)

One hundred years ago—on the 23rd July, 1836—H.M.S. *Buffalo*, Captain John Hindmarsh, R.N., in command, set sail from Portsmouth for that portion of New Holland—by which name Australia was still generally known—which, under the inappropriate name of South Australia had, in 1834, been "erected" by Act of Parliament into a British Province, but which had not yet been officially occupied. Captain Hindmarsh—to be known in later life as Admiral Sir John Hindmarsh—had been appointed the first Governor of the new Province: his had been a successful naval career, served successively under Howe, Cornwallis, Saumarez, Cochrane, and Nelson. It was therefore particularly unfortunate in his present appointment, that a man of his temperament, immediately prior to assuming office as Governor, should as Commander have been confined for five trying months to the narrow limits of a vessel of 850 tons burthen, in daily authoritative contact, and frequently irritating contact, with men who would claim independence of judgment and action so soon as land were reached: and who later would not hesitate to visit upon the Governor the egoisms and shortcomings of the naval tyrant; nor could such happenings do anything but impede the immediate progress of settlement in the Province.

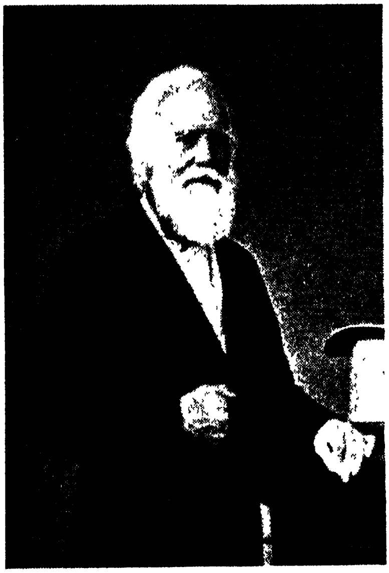
The *Buffalo* was freighted with provisions and ordnance stores, and carried 37 cabin passengers and their children, in addition to 87 assisted emigrants and their 47 children. Earlier in the year the *Buffalo* had been preceded for the same destination by eight other vessels, among them the *Rapid* in charge of Colonel William Light, soon to become the tragic founder of the City of Adelaide: three other of these vessels were the property of the South Australian Company, which had already played a striking part in helping to lay the foundations of the new Province, and which presently—in the difficult opening years of settlement—was again and again to render it yeoman service.



Colonel William Light, First Surveyor-General and Founder of Adelaide.
(From a painting in the National Gallery, Adelaide.)

Over the remaining months of 1836, five additional vessels left the British Isles for South Australia, and one from the Cape of Good Hope. All these vessels—15 in number—were variously freighted with what it was hoped would adequately meet the early requirements of a new Colony, planted in the wilderness and distantly situated from other sources of supply; and among these, provisions, general stores, furniture, building materials, tools of trade, agricultural implements, livestock, surveying appliances, &c. In the aggregate these 15 vessels brought with them 147 cabin passengers and 809 assisted emigrants, children included in either case: or a grand total of 955 prospective South Australians—of either sex, adults and children. In these days the voyage out from Europe was spread over three to six months, according as conditions were more or less favourable: and it followed that vessels leaving British ports in the latter half of 1836 might not reach South Australia until some time in 1837: in effect, five of them reached their destination between January and April, 1837.

Such then was the vigorous start in life given to this virgin British Province 100 years ago: the most auspicious start it was said at the time, ever given to a Colony in modern records: and in the immediately succeeding years the unspent energy of this initial impetus continued to make itself felt. By the end of 1838 an aggregate of 6,406 passengers and emigrants had sailed for South Australia, including 537 prospective German settlers. But our present concern is the progressive development of the agricultural and pastoral industries of South Australia—and with perhaps equal accuracy it might perhaps be stated, the gradual unfolding of general development in the Province itself—and it is probable that in the course of such a study, we shall find it difficult to picture adequately the magnitude of the effort put forth in the opening years of settlement, and of the manifold difficulties that had to be overcome, unless able in imagination to cast our minds back over the intervening decades,



George Fife Angas, First Chairman of the South Australian Company, and prominent pastoralist and merchant.
(By courtesy of Archives.)

and to visualise the fundamental differences between our present-day environment—material and intellectual—and that which confronted our forefathers in 1836. Hence it seemed logical that a glance at conditions and circumstances as they then were should precede any attempt to describe the development therefrom of the heritage that eventually came down to us.

When we pause to consider that the earliest attempts to wedge in a new Colony betwixt the Eastern Settlements of New South Wales on the one hand, and the more recent, but unsuccessful Western Settlement of Swan River, on the other, dated back to 1829, we shall realise that the protracted birth of South Australia was set in troublous times indeed, which in some measure were contributory factors in the grave difficulties of its early years. The Napoleonic Wars, and the years that immediately succeeded them had accumulated much treasure in individual British coffers, and to some extent even had spread a mist of fictitious prosperity over the kingdom as a whole: speedily to be dissipated, however, in the latter case by the inevitable reaction assisted by a rigid policy of monetary deflation. The prices of commodities fell by 50 per cent., unemployment became rife, and suffering and misery overwhelmed the poorer classes, and led to disorders and riots in various parts of the British Isles. The leaders of the malcontents were not slow to impress upon the latter that all the evils that had befallen them were to be attributed to Ministerial (Tory) incompetence and extravagance, supported by the sinister influence of those said to control the "rotten boroughs" from their seats in the House of Lords: and soon from one end of the kingdom to the other was vehemently preached the doctrine of "Electoral Reform"! And the Whig politicians, who had always claimed to be the natural champions of all liberal ideas, and who moreover constituted at the time His Majesty's Opposition, notwithstanding inward misgivings, allowed themselves to be pushed into the front ranks of the movement.

In the meanwhile, violent revolutionary movements came from all quarters of Europe to lend opportune spiritual help to the would-be British Reformers. As was customary in those days, the spark that set going these sporadic uprisings was lighted in Paris: towards the end of July, 1830, an insurrection broke out in that town, and rather than face Civil War the French monarch fled from his throne. Taking heart from the exploits of the Parisians, the Belgians rose in their principal cities and drove the Dutch troops back to Holland: eventually they secured the separation of Belgium from the Kingdom of the Netherlands. Almost concurrently, revolutionary outbreaks were reported from various German centres, notably in Cologne, Leipsic, Dresden, Bavaria, Brunswick, &c. There were risings, too, in Spain, Italy, and Switzerland.

All this political effervescence on the Continent of Europe was not without influence on public opinion in the United Kingdom: and on 30th November, 1830, the Duke of Wellington, who had taken a definite stand against "Reform" of any kind, was compelled to announce the resignation of his Ministry: it was succeeded by a Whig Ministry led by Earl Grey, who was committed to "Reform" to the hilt. But it was not until 19 months later—July, 1832—that the celebrated Reform Act reached the Statute Book· intensely, but covertly disliked by the King; uncompromisingly opposed by the House of Lords; but vehemently and violently championed by the masses: nor did it become law in the land until personal violence had been offered to both the King and the Duke of Wellington.

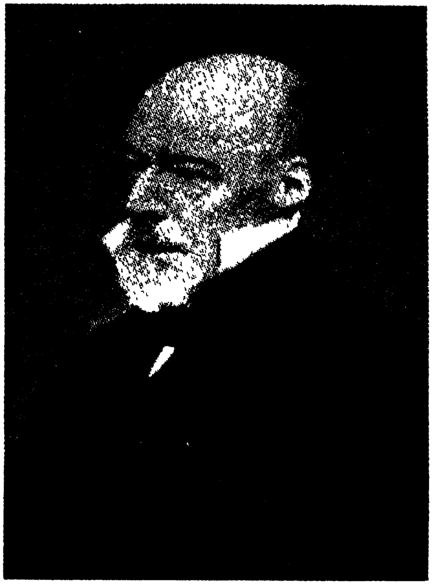
The 1832 Reform Act, which in effect "terminated the long-established dominion of the landed and commercial aristocracy" of Great Britain, "and vested it in the class of capitalists, shopkeepers and small landholders,"* had from the standpoint of the Colonies repercussions as startling as they were unforeseen. In the first place, it seemed to have given an unexpected fillip to emigration from the British Isles, which clearly must have benefited those Colonies in need of immigrants, and able to offer them terms sufficiently attractive. But an examination of the figures on the subject tended to show that by far the greater proportion of the emigrants was attracted to the United States of America: in other words, such generally were their circumstances that they dared not resist the call which seemed to offer the surest promise of work denied to them in their own homeland: secondly, the special interests of the reformed British Electorate were, in the main, diametrically opposed to those of the Colonists in general. The main anxiety of the latter, so soon as initial settlement difficulties had been overcome, had ever been the securing of markets prepared to accept their products at prices remunerative to themselves: nor was it unnatural that they should recollect that their teeming kinsfolk over the seas were both sellers of manufactured goods and purchasers of raw materials and foodstuffs; and that, in the circumstances, trade, mutually beneficial, should ensue. But the ruling principle in life of those upon whom Reform had thrust unwonted political power was *economy*: *economy* at home and abroad: and in particular strictest *economy* in all Government affairs: *cheap buying* ensured by unrestricted competition of all would-be sellers, colonial or foreign, on free British markets. Such views were gradually moulded into a body of political theory and practice, which eventually came to be looked upon as sacrosanct, not to be questioned by any political party that might happen to be in power: and one of its natural consequences was the ruin of the once prosperous West Indies: but the African, American, and Australasian Colonies were of tougher fibre, and grimly trod the paths of self-denial and self-reliance which eventually led to nationhood.

**History of Europe*, by A. Alison, vol. IV., page 1.

Robert Gouger, First Colonial Secretary.

It was in the bleakness of this reformed British world that men such as George Fife Angas, Robert Gouger, Colonel Torrens, W. W. Whitmore—to mention but a few of those who interested themselves in the founding of South Australia—met together, discussed ways and means, and presented themselves at Ministerial offices, and urged the national importance of early settlement of the land lying between New South Wales and the Swan River Settlement, which had been skirted by Matthew Flinders in 1802, and favourably reported upon by Charles Sturt in 1830. Fortunately or unfortunately, this body of men, who could mingle idealism with shrewd business practices, came under the influence of the Wakefield principles of colonisation, and embraced them with the fervour of neophytes, which somewhat hampered the success of their negotiations with colder official circles. These principles professed to point the way to success in Colony building, which according to their propounder had hitherto eluded would-be architects, whose main errors had been free grants of land and low sale prices of Crown lands. It was also contended that all moneys received from the sale of Crown Lands should be exclusively reserved for the purpose of promoting the emigration of tradesmen and labourers.

Between 1830 and 1834, various proposals for establishing South Australia as a free Colony (*i.e.*, free from convicts) based upon the Wakefield principles were devised and presented by this body of private individuals and successively rejected by the representatives of Government. Apparently, the main bone of contention between the two parties was whether a Colony controlled by a Chartered Company should be created or simply a Crown Colony: "A Colony founded by Charter," said George Grote, the historian of Greece, "was an example of that delegation of authority which, in perpetual succession, had for ages been a leading principle of the British Government, while a Colony founded by the Crown was an example of that central authority, acting at whatever distance from the seat of Government, by means of temporary agents, which was a leading principle of the French Government."* In the present instance it was the body of private enthusiasts that championed the British Colonial model, whereas the representatives of the British Government pressed for the French one; eventually, lurking realism coming to their aid, the enthusiasts saw the wisdom of compromise, and agreed to accept a modified form of Crown Colony, based upon the Wakefield principles. And accordingly, without much further trouble, the first South Australian Act received the King's assent on the 25th of August, 1834.



Colonel Torrens, Chairman of Second Board of Colonisation Commissioners

Among other things, this Act provided that no convicted felons should be admitted to the Colony; no free grants of land should in any circumstances be made; all Crown lands should be open for purchase by cash at prices not less than 12s. per acre, and as much as possible offered in small sections of 80 acres each; apart from the preliminary purchases effected in England, all such purchases should take place at duly advertised auction sales; such sales to be under the management of a Board of Commissioners empowered to give a title in fee simple to each purchaser without reservation of rights above or below the soil; the whole of the proceeds of such sales to be set aside for the conveyance of British and Irish labourers to the Colony; such labourers to be equal in numbers as to sexes, and preference to be given to young married couples without children; no part of the expense of founding or governing the Colony should fall upon the Mother Country; the Commissioners would be empowered to borrow £200,000 on the security of the Colony, of which £20,000 was to be invested in exchequer Bills in the names of Trustees to be appointed by the King.†

The final clause of the Act forbade the Commissioners from taking any steps towards founding the Colony until such time as they had invested the £20,000 above referred to, and until they had sold and received payment for £35,000 worth of land situated in an unknown wilderness, sparsely occupied by wandering tribes scarce emerged from the paleolithic age.

Such an Act, no doubt, was an excellent "Reform" Whig Act—that is to say, it was so from the viewpoint of the "Reform" Electorate—it purported to establish a new Colony without cost to the Electorate, or even to the Mother Country: but, better still, it purported to relieve, without cost, the local authorities of the support of numerous unemployed persons, directly or indirectly:

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*Quoted by Edwin Hodder in *History of South Australia*, vol. I., page 27.

†Adapted from Edwin Hodder, *History of South Australia*, vol. I., page 28.

who, should they succeed, would presently become acceptable purchasers of British goods. But in their excess of caution, its authors had almost condemned to still-birth this excellent piece of legislation. The newly-appointed Commissioners soon realised that although it seemed to be their ostensible duty to call into being a new Colony, situated some 12,000 miles from the scenes of their activities, yet the means of doing so—adequate funds—had been carefully withheld, or at all events placed beyond their reach. It was true that the Commissioners were empowered to borrow money for the services of the Colony: but such a loan would not have had the backing of the British Government: and in the circumstances, except at usurious rates of interest, what person, or persons, would have been likely to take up a loan on the mere problematic prospects of a Colony yet to be founded on questionable principles, in a distant wilderness, and concerning which little or nothing was known? After considering for six consecutive months this initial problem, and finding no solution to it, the Board took eager advantage of the fall of the Grey Administration, and handed in its collective resignation.

Captain Matthew Flinders, First Surveyor of South Australian Coasts.
(*By courtesy of Archives.*)

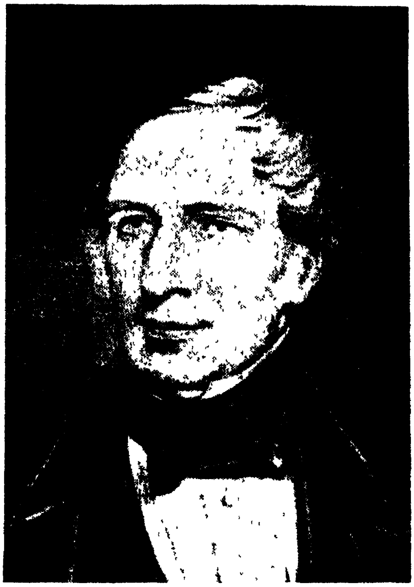
Nothing was done to replace the resigning Commissioners during the brief tenure of office of Sir Robert Peel's Administration, but one of the first administrative acts of Lord Glenelg, on his appointment of Secretary of State for the Colonies in the Melbourne Administration, was to appoint a new Board of Commissioners, including the following:—Colonel Torrens (Chairman), George Fife Angas, E. Barnard, W. Hall, John Shaw LeFevre, W. A. MacKinnon, M.P., S. Mills, Jacob Montefiore, G. Palmer (jun.), J. Wright, and Rowland Hill (Secretary).

After uncompromising rebuffs from the Colonial Office for accommodation in any shape or form, the newly-appointed Board raised a loan of £1,000 for current preliminary expenses, and proceeded to attack the apparently unworkable clauses of the Act. How to sell £35,000 worth of land, 12,000 miles away received their first consideration. The Act had stipulated that no land should be sold at less than 12s. per acre: but the Board considered that 12s. per acre would be insufficient for the early emigration requirements of the Colony: and accordingly, in their first regulations, £1 per acre was fixed upon as the price at which land was to be sold in the Colony, or £81 for a lot consisting of one town acre and a country section of 80 acres. Priority of choice for both town acre and country sections was to be given to the holders of the first 437 land orders secured in England: if complete sales were effected, the latter would more than complete the £35,000 worth of land sales stipulated by the Act. In addition, it was provided that anybody paying the price of 4,000 acres or upwards would have the right to ask for a "special survey" in any compact district not exceeding 16,000 acres, from which the applicant would have the right to select 4.000 acres, or more, before any other application would be entertained.

Agents were appointed throughout the Kingdom, and special measures taken to bring South Australia and its possibilities under the notice of the public. The

Board's regulations were issued towards the end of June, 1835, and by mid-August one-half of the required amount of land had been definitely sold: but sales seem to have come to a standstill, and the question of reducing the price of land to 12s. came up for discussion. At this stage, Angas came forward with the proposal that, if the price of land were reduced to 12s., a company could be formed to take up the land orders still outstanding, and so complete the £35,000 required by the Act. If not sinister, at all events self-seeking motives were said to have been at the back of this proposal: and that, had the general public been advised that the price would be reduced to 12s., there would probably have been no difficulty in disposing privately of the remaining land orders. In such a connection, it is perhaps as well to recall that most if not all human motives are mixed: and that, even if the worst were conceded, which personally I would not be prepared to allow, Angas's proposals, which led eventually to the formation of the South Australian Company, were on the whole of advantage to South Australia: it cannot be denied that they brought to the Colony financial power of which it stood sorely in need.

The next step was to raise the £20,000 required to be deposited with trustees: this was eventually done, but with some difficulty, and at the exorbitant rate of 10 per cent.



Captain Chas. Sturt, First to Navigate the Murray to its Mouth and enter South Australian territory
(By courtesy of Archives.)

These preliminary difficulties overcome—or shall we say for the time being circumvented?—the Colonisation Commissioners, to whom the privilege of making appointments, or recommendations thereto, had been conceded by the Secretary of State, set about the delicate task of selecting the first Governor of the new Colony, and its chief administrative officers.

It was probably obvious from the outset, that in a new Colony, to be developed upon distinctly experimental lines, concerning which precedents had yet to be established, the position of the first Governor was likely to be difficult: and, in the circumstances, one would imagine that special pains would have been taken to choose a man of appropriate qualifications and temperament; but judging from results, this does not seem to have been done: and this omission, or error of judgment, told heavily against progress in the early days of settlement.

The first to be approached for the purpose was Colonel Charles James Napier, who was subsequently to distinguish himself in India. After protracted negotiations, Colonel Napier announced that he could not accept the position of Governor of South Australia unless (1) in the possible event of financial distress he were definitely authorised to draw upon the British Treasury to the extent of a sum "equal to that required for the Swan River Colony in its various difficulties:"* and (2) a troop of 200 marines were placed at his disposal both for the maintenance of internal order and for the protection of colonists against escaped convicts and possible hostile natives. The Commissioners rejected both of these stipulations, the wisdom of which, however, was to be justified by sub-

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**Colonisation Particularly in South Australia,* by Colonel C. J. Napier.

sequent events: their objections were, in the main, grounded upon the fact that the stipulations "were at variance with the self-supporting principle upon which the new Colony was to be established":* and for this contention the Commissioners appear to have been condemned on insufficient grounds, since although not stated in so many words, the contention appears to be implicit in the Act which erected South Australian into a British Province.

Rowland Hill, Secretary to Second Board of Colonisation Commissioners.

The Commissioners then gave their attention to the next candidate—Captain John Hindmarsh — who unfortunately created the right impression, and was duly appointed first Governor of South Australia. Neither by temperament nor training was Hindmarsh adequately equipped for the position: nor, indeed, were his mental attainments such as to admit of ready adjustment to his quite unexpected environment Fortunately for himself he had by his side, as private secretary, George Stevenson—pragmatic egoist though he was, nevertheless a man of considerable ability, determination, and soundness of judgment—who almost single-handed supported Hindmarsh against a cohort of truculent wrangling officials, discreetly led by James Hurtle Fisher, Resident Commissioner, and past master of Fabian tactics.

In exculpation of Hindmarsh's obvious failure as Governor it can be urged that he had been set a task almost impossible of accomplishment, namely, effectively and economically to give the initial start to a new Colony planted in the wilderness, although hamstrung by an Act of Parliament that had deliberately established duality of control in a Colony, situated 12 months away from any possible over-riding decision in unavoidable cases of dispute, and had denied reasonable access to necessary funds and to the financial backing of the Mother Country. On arrival in South Australia, Hindmarsh, the autocratic naval commander, was soon to learn that however much he might claim to be the King's Chief Executive Officer in the Colony, he was powerless to enforce his views upon the Resident Commissioner and his staff of Emigration Officers and surveyors; that his Council of State, which consisted of the Resident Commissioner and three departmental heads, and from which he had a right to expect helpful advice, was, in the main, hostile to him personally; and that in the acrimonious discussions that arose he was obliged to fall back on the Clerk of the Council—George Stevenson—for moral and intellectual backing, although the latter was not technically a member of the Council: and, finally, that his Advocate-General and official legal adviser could *officially* tender him dubious advice, whilst *extra-officially* he edited a publication which indulged in polemics at the Governor's expense. In the circumstances, it spoke volumes for Hindmarsh's powers of endurance that in spite of all these galling difficulties he was able to continue in office for over 18 months: and those who have bewailed the fact that, upon Colonel Napier's withdrawal, the position of first Governor had not been offered to Colonel Light, must surely have overlooked the latter's supersensitive soul, and its sheer inability to ignore the attacks and obstacles which apparently had but little effect upon Hindmarsh's more stolid nature.

******Colonisation Particularly in South Australia*, by Colonel C. J. Napier.**

Many of the early troubles of the Colony were attributable to the incompetency of some of its officers—some of the early surveyors, for instance—and some to the pugnacity and lack of loyalty of most of them. In this connection it has been alleged—and apparently upon sufficient grounds—that the Commissioners in their choice of officers were generally guided by considerations other than general skill and special fitness for the positions under consideration. Their financial difficulties were such that they did not feel able to offer more than very moderate salaries even for positions involving grave responsibilities: and coupled with the fact that prospective officers would have to expatriate themselves and their families, it was obvious that the Commissioners' circle of choice must eventually have had but a very small diameter They also seemed to think themselves under obligation to listen favourably to the claims of those who had helped to bring the Colony into being. Again, "candidates for office who became purchasers of land, were considered to possess priority of claim."* Personal wealth, or ability to wait for a salary, was also considered adequate recommendation for office. It has even been stated that one of the unavowed objections to Colonel Napier as Governor was the discovery that he was not a wealthy man.

James Hurtle Fisher, First Resident Commissioner.
(By courtesy of Archives.)

Obviously, therefore, on such a basis of selection a competent first-class civil service could not have been expected; but if we overlook their unavoidable initial unfitness, it will perhaps be allowed that their energy, acquisitiveness, fighting powers, and sometimes even the wealth which they brought to the Colony, must have assisted the latter to extricate itself from the "Slough of Despond" into which they had helped to cast it.

We can now turn to the *Buffalo*, with its freight of officials and emigrants, safely at anchor in Holdfast Bay after a voyage of 159 days, and from which the Governor elect and party on the 28th of December, 1836, landed on what was soon to be known as the Glenelg Plain, to proclaim the new British Province of South Australia. The Governor is said to have been "very affable, shaking hands with the Colonists, and congratulating them on having such a fine country":† during the course of the festivities that followed the ceremony, he is reported to have proposed, with some prophetic misgivings, one presumes, "May the present unanimity continue as long as South Australia exists." And this sentiment, said the diarist,† made the plain ring with acclamations.

Nine vessels had now reached South Australia, and in the aggregate had landed 552 adults and children: of these, approximately 100 were of the official or settler classes, most of whom had taken up land orders in England in 1835 for purposes of settlement in South Australia, or were the agents of others who had done so. In addition to these vessels, six others were already on the way thither; and many others were to follow in the near future. Al these would-be settlers were filled with eagerness and anxiety to take up at the earliest possible moment the land they had already paid for in England: some, because they could not afford to sit down and watch their meagre capital gradually melting away—and, with it, their chances of becoming settlers in the near future—in a country in which the prices of the necessaries of life soon soared to heights undreamt of in their simple philosophy; others, because realising how much at variance were the climatic and economic conditions of their new home from those upon which had been built up such farming experience as they possessed, were anxious not to miss unnecessarily a single season in building up what the more intelligent among them must have realised would be a completely new experience. Particularly insistent in this direction were the bustling representatives of the powerful South Australian Company. But, whatever their reasons, all alike could not but feel dismayed when it was gradually borne upon them that although the surveyors had been in South Australia since August, 1836, not a single acre of land had been surveyed when the *Buffalo* dropped anchor in Holdfast Bay; and that neither occupation nor selection of land would be allowed prior to survey.

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*Second Report of Select Committee on South Australia.

†Mrs. Robert Thomas.

George Stevenson, Private Secretary to Governor Hindmarsh, and First Editor of the South Australian "Register."

The Colonisation Commissioners were probably aware of the danger of landing a large number of emigrants before land could be allotted to settlers, and work provided for tradesmen and labourers: and they made a half-hearted attempt to parry the danger by sending out the *Cygnet* in charge of the Deputy-Surveyor (George Strickland Kingston), and the *Rapid* in charge of the Surveyor-General (Colonel William Light) 126 and 84 days, respectively, ahead of the *Buffalo*: but they had been unable to check the impatience of the South Australian Company, three vessels of which reached Australia before any of those of the Commissioners and landed their passengers, equipment and goods on the shores of Nepean Bay: here they established the settlement of Kingscote, which under the management of the notorious Samuel Stephens became the first of the many centres of activity of the South Australian Company. But apart from all other considerations, the task allotted to Colonel Light could not have been completed within the limited time at his disposal. The Commissioners' general instructions were to the effect that the area of land surveyed, and therefore open for selection and settlement, should at all times be considerably in excess of the estimated demand for land at any given time. Hence, whilst on the one hand Light might have been expected to make adequate provision for the early requirements of the settlers, he was compelled by special instructions—and one cannot imagine any other being given—to give

Sir John Jeffcott, First Judge in South Australia.
(By courtesy of Archives.)

priority to his search for the most suitable site for the Capital City, and to take note of other sites on which secondary towns might be built at some future time: and he was then to lay out the Capital City in accordance with the Commissioners' instructions. To this end he was directed carefully to examine the South Australian coast line, with the exception of such portions of it as had already been shown by Flinders and other navigators to have no suitable harbours: his attention was particularly directed to Nepean Bay, Port Lincoln, the neighbourhood of the mouth of the Murray, and the eastern coast of Gulf St. Vincent.

Colonel Light carried out his instructions as expeditiously as the means at his command permitted, and eventually settled upon the present site of Adelaide with its somewhat distant sea connection a few days before the arrival of the *Buffalo* at Holdfast Bay, with Governor Hindmarsh aboard.

Although Colonel Light was at the time prepared to lay out the city in accordance with his instructions, some slight delay arose owing to differences of opinion as to the suitability of the site: Governor Hindmarsh was among the objectors; so was the Judge—Sir John Jeffcott—and many others. Because of this brief delay Captain Hindmarsh has been accused of obstructive tactics, and the whole blame for the delayed surveys thrown upon him on quite inadequate grounds. As a matter of fact the Governor landed at Glenelg on the 28th of December, 1836, and the laying out of the town by Light and his staff started on the 11th of January, 1837, that is to say, exactly one fortnight after the landing of the Governor, and the survey was completed by the 10th of March following. Surely, whatever the natural attractions of the proposed site, so important and far-reaching a decision was well entitled to one whole fortnight's consideration!

(*To be continued.*)

Club Root of Turnips.

This disease is caused by a species of slime mould (*Plasmodiophora brassicae*), and affects many plants of the Crucifer family, including such crop plants as cabbage, cauliflower, turnip, &c., and weeds such as Mustard and Shepherd's Purse," said Mr. A. G. Strickland, M.Sc. (Chief Horticulturist) in reply to a question from the Karte Women's Branch of the Agricultural Bureau asking for the cause and cure for club root of turnips.

Continuing, Mr. Strickland said, "A single diseased root will produce millions of spores which are set free in the soil by its decay, and these spores are capable of infecting subsequent crops on the same ground. The disease may also be spread from one patch of soil to another on implements, feet of animals, and in moving water.

The disease is favoured by acid or sour soils, and excessive use of acid fertilisers (such as sulphate of ammonia), unless offset by the use of lime, will encourage club root.

CONTROL.

SANITATION.—Diseased roots, if fed to stock, should be first boiled, as spores of the disease may pass through the alimentary tract of animals. All refuse from a previous crop of cabbages, turnips, &c., should be destroyed. Weeds of the Crucifer family which may harbour the parasite should also be kept suppressed.

ROTATION.—The Club Root organism can live in the soil for several years, and when a patch of soil is badly affected with the disease, no cabbage, cauliflower, turnip, brussels sprout or rape crops should be grown on the land for a period of four or five years. At the same time, weeds of the mustard family should be eliminated.

SOIL TREATMENT.—If stable manure is used as a soil dressing, it should be applied 12 months prior to the growing of susceptible crops. As acid soils favour the disease, affected land should be treated with lime, if there is any suggestion of soil acidity. Badly drained and water-logged soils also favour the disease, and should either be avoided or provision made for adequate drainage.

Prickly Pear Eradication

[By R. C. Scott, Chief Agricultural Adviser.]

In view of the encouraging results of experiments in the biological control of prickly pear on the property of Mr. W. A. Tough, of Pooraka, by means of the Indian Cochineal insect, the Department is prepared to co-operate with landowners desirous of liberating the insects in prickly pear infested areas.

Healthy section of Prickly Pear (*Opuntia monacantha*).

The home of the prickly pear is North and South America, where many species exist. A number of these species has been introduced into Australia and that commonly found in this State is the Smooth Tree Pear. (*Opuntia monacantha*). This variety is fairly widespread throughout the Commonwealth, but is not so vigorous nor such a serious pest as the main pears of Queensland and northern New South Wales, namely, *Opuntia inermis* and *Opuntia stricta.* In the early history of the prickly pear in Australia it is reported that the first introduction occurred in 1788, when a few plants, probably *Opuntia monacantha,* were imported from Brazil. In 1839 a single plant, believed to be *Opuntia inermis,* was introduced into the Scone district in New South Wales, and as sections became available, they were planted for hedges and breakwinds. It is considered that from this one plant much of the tremendous infestation commenced. In any case *Opuntia inermis* is the most serious species and at one time was estimated to occupy some 50,000,000 acres in Australia. This has taken place in less than 100 years and gives some idea of the rapidity with which the prickly pear spreads under favourable climatic conditions. On the other hand, South Australia does not possess a climate well suited to the strong development of summer-growing plants, and prickly pear has not made much headway in this State. Moreover, the species doing the most damage in Queensland either does not thrive or has not been introduced, since it is *Opuntia monacantha* which is regularly found here.

At the same time prickly pear has been planted in a number of locations. These hedges and clumps steadily expand, and in the course of a few years occupy a considerable area of land, although the plants do not readily spread to adjoining fields by means of leaves or seed that may be carried there by various agencies.

Some patches have been destroyed by arsenical applications, but this is expensive. Others again have been eradicated by hand grubbing, a most unpleasant operation because of the long, sharp spines and small prickles, and consequently it is interesting to report the work done in the biological control of the prickly pear in South Australia.

Section of Prickly Pear attacked by the Indian Cochineal, which can be seen in white clusters on the leaves and fruit.

Biological Control in Australia.

Much has been accomplished in the biological control of the prickly pear in Australia. The work was first commenced by the Queensland Government in 1912, whilst since 1920 it has been continued by the Commonwealth Prickly Pear Board. However, the work of the latter body ceases with the establishment of insects and their thorough testing for safety so far as other plants are concerned, and the distribution of the insects throughout the infested areas is a matter of State action.

Biological control is based on the fact that in countries where the pear develops naturally there must be certain enemies and diseases which prevent rapid expansion, otherwise it would take absolute charge of all land.

When prickly pear was first brought to Australia those enemies were not included, and consequently if they could be introduced without their particular enemies some degree of control could be anticipated. Naturally this meant the isolation of disease and pest free insects and testing to see that they would not attack other plants as soon as the pear was wiped out; also breeding and acclimatising under Australian conditions and trial in the field for multiplication and preference on the different species of pear.

Much care was taken to ascertain whether any insects liberated were likely to destroy useful plants after the prickly pear was eradicated, and where there was the slightest doubt in this respect the trials with that particular insect were abandoned. As a result, the various insects liberated by the Commonwealth Prickly Pear Board can be introduced to a district without any fear that they might ultimately prove a serious menace to the useful plants of that area.

It was found that the insects exhibited distinct preference for different species of pear, even to the extent that it did not always follow that one naturally feeding on a particular pear in America would attack the same species grown in Australia. Notwithstanding these difficulties great headway has been made, and as the result of the introduction and liberation of insect enemies of the prickly pear, the spread of this plant in Queensland and New South Wales has not only been checked, but in addition vast areas of previously infested land have been reclaimed for agricultural purposes. This has been largely due to the *Cactoblastis cactorum*, an insect with remarkably destructive powers, which has completely changed the outlook in Queensland and made the prospect of complete eradication much more hopeful.

This Clump of Prickly Pear shows the extensive growth which is possible in favoured situations in South Australia.

Biological Control in South Australia.

Early in 1934 inquiries were received from Mr. W. A. Tough, of Pooraka, relative to the introduction of insect pests into a belt of prickly pear which many years previously had been planted as a hedge on his property. This strip, which was about a quarter of a mile in length, had spread to a width of up to 2 chains and some of the butts exceeded a foot in diameter.

Eradication by various means had been attempted, but no permanent success had been obtained and he was anxious to test insect pests under the climatic conditions of this State. Accordingly Mr. Tough communicated with the Officer-in-Charge of Investigations for the Commonwealth Prickly Pear Board (Mr. Alan P. Dodd), who stated that the *Opuntia monacantha* had been so completely destroyed in Queensland by the Indian Cochineal (*Dactylopius indicus*) that both this species and the insect had practically disappeared. However, he would endeavour to obtain material for forwarding, but in the meantime would arrange for the consignment of 50,000 eggs of the *Cactoblastis cactorum*, although little information was available regarding the injurious effect of this insect on the type of pear in South Australia, namely, *Opuntia monacantha*. *Cactoblastis cactorum* is a native of Uruguay and was introduced into Australia by Mr. Dodd in 1925. The moth lays its eggs in long chains or sticks, each stick averaging about 75 eggs. The female lives for a few days only, during which time she lays about 150 eggs, and these take from 3 to 6 weeks to develop. On hatching, the young caterpillars tunnel into the prickly pear plant eating out the centres of the leaves and moving from section to section. In this injury caused by the insects, rot tend to develop and assist in destruction.

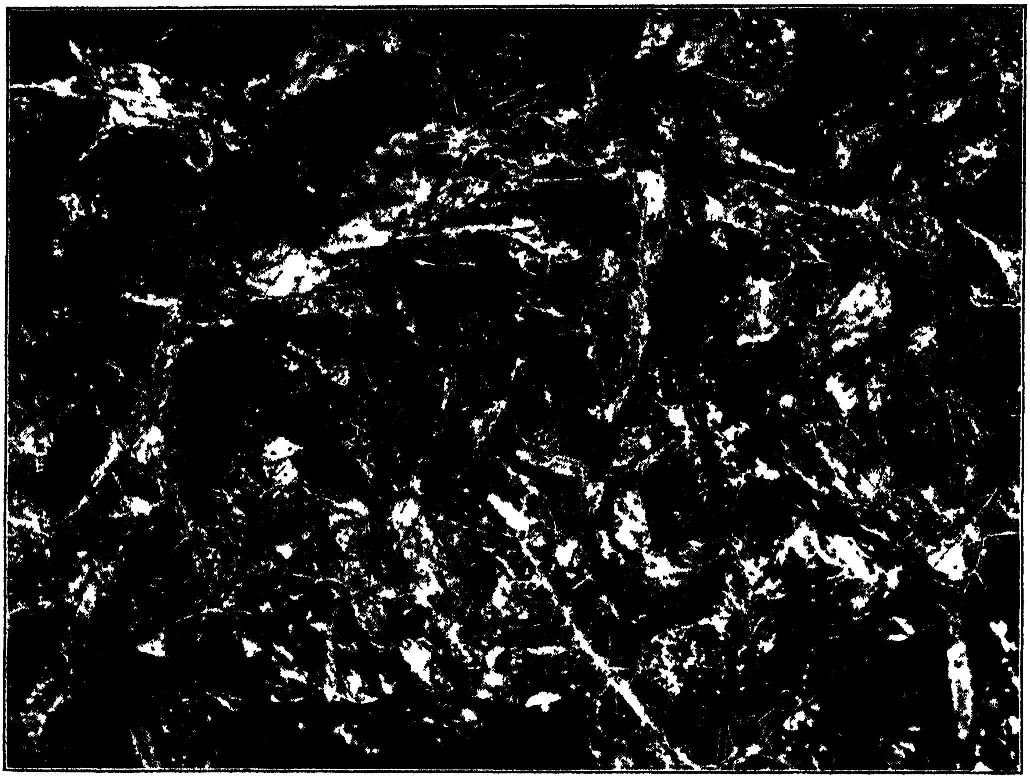
As a rule there are two generations each year, the moths emerging and laying eggs in September-October, and again in January-February. They may travel some miles before the eggs are deposited, but as a rule this takes place close to the point of emergence. Consequently the caterpillar attack is likely to become very concentrated and destruction is rapid. The 50,000 eggs promised by Mr. Dodd were received toward the middle of March, each egg stick being pasted to a piece of paper. The papers were immediately set out in the clump by fastening with a pin or spine to a moderately succulent leaf with the eggs against the surface of the plant. During the first week of April small holes where the caterpillars that had hatched from the eggs had tunnelled into the leaves were noticed, but in the period between placing in the field and hatching a number of eggs had been destroyed, probably by mice consuming the paste, as holes had been eaten out of many papers where the eggs sticks had been attached.

About a week after tunnelling commenced blotches showed on the leaves. These increased in area until some four weeks later the flesh was reduced to a pink pulp contained within the outer skin of the leaf. The action continued until towards October, when cocoons were spun in the rubbish at the foot of the plants and moths emerged in December. In the following month a new generation hatched out and commenced operations, but the numbers did not appear to have increased to any extent.

Originally planted as a hedge, the belt of Prickly Pear spread to this width.

In August caterpillars were fairly plentiful and as cocoons were noticed in February, 1935, it was thought that the *Cactoblastis* had become well established. Mr. Dodd advised that the fact that the number had not become appreciably greater was not important, as the insect rarely showed a material increase during the first year or so, but if the environment was suitable, could be expected to multiply next season. However, by October, 1935, no *Cactoblastis* could be found, and for some reason or other died right out. To-day no insects are to be seen, and in this trial the caterpillar, which has proved so wonderfully effective on the main pest pear in Queensland, has not been successful on the pear variety in South Australia. Whilst the results with *Cactoblastis cactorum* have been disappointing the reverse has been the case with the Indian Cochineal (*Dactylopius indicus*).

This insect was introduced from Ceylon by the Queensland Travelling Commission in 1913, and successfully established on *Opuntia monacantha* by Dr. Jean White Haney. It is really a native of South America and another strain of the same insect was introduced by the Prickly Pear Board in 1925, but has shown the same preferences as the earlier importation.



Close up of plant attacked by the Indian Cochineal. The sap has been removed by the insects, and the sections are collapsing

Mr. Alan P. Dodd describes these insects as follows:—

"The Cochineals are soft-bodied, scale insects or mealy-bugs covered with white wool or down composed of fine silky threads. The males are very small delicate-winged flies; the females are wingless. The eggs are laid in numbers beneath the body of the female. The young Cochineal or "crawler" is possessed of normal legs, but when a suitable feeding spot has been located, its trunk or proboscis is forced through the cuticle of the joint, and for the rest of its existence it remains stationary; the legs gradually atrophy and the woolly covering is secreted; the trunk serves to attach the insect firmly to the plant, and attempted removal results in death. The females are prolific; during the summer a new brood is produced every few weeks. The crawlers are so small that they can be carried great distances by wind; this method of dispersion explains the rapidity of Cochineal spread, and the fact that isolated plants many miles from other pear clumps are infested with colonies. The density of Cochineal infection depends on weather conditions; heavy summer rains destroy the crawlers and other colonies, hence its virulence is sporadic and is greatest in years of low rainfall or during the drier months."

In earlier correspondence Mr. Dodd expressed doubt as to whether Cochineal was obtainable for forwarding to this State, but eventually located some, and toward the end of May, 1934, consigned a case containing prickly pear leaves infested with this insect. These were placed at intervals among the plants and covered loosely with pear branches in order to afford shelter during the wet winter months. For some time there were no signs of establishment, and it was not until the warm, dry summer weather was experienced that the Cochineal commenced to multiply to any extent.

General view of a clump after attack This portion will shortly be ready for burning, when the spines will be destroyed.

At the end of the winter in the following year, that is to say, 1935, the infestation was evident in a number of places, and was particularly heavy under the heaps of rotting leaves which had been used for the protection of the original introduction.

By February of this year the insect was plainly noticeable in a number of places with some patches showing the effect of the attack, whilst in the past few months, during which the spring weather has been unusually dry and warm, it has made wonderful headway, and is causing great destruction of pear plants.

The illustrations will show the remarkable changes which are being brought about, and it is reasonable to anticipate that the Indian Cochineal will suceed in controlling the prickly pear in South Australia in the same way as it has similar species in other States of the Commonwealth. In connection with the results achieved it should be recalled that it is only 2½ years since the insect was first introduced into South Australia.

Distribution of the Indian Cochineal to other Infested Areas.

By arrangement with Mr. W. A. Tough, who was responsible for the introduction of the insect into South Australia and has done all the work in connection with its establishment, the Department of Agriculture will co-operate with any landowner desirous of liberating the Cochineal in prickly pear infested areas. The Cochineal is most active during the warmer and drier periods of the year, and for about four months is more or less dormant. Therefore from October to February would probably be the best period of the year for distribution.

Anyone wishing to introduce the insect to clumps is invited to communicate with the Department so that arrangements toward this end can be made, and in doing so need have no fear that the Cochineal will attack other plants after the prickly pear has been destroyed, since it was very thoroughly tested in this respect before being liberated in the Commonwealth.

References.

A. P. Dodd, *Biological Control of Prickly Pear in Australia* (C.S.I.R. Bulletin, No. 34).

A. P. Dodd, *The Progress of Biological Control of Prickly Pear in Australia* (Commonwealth Prickly Pear Board Bulletin).

Care of Horses.

[P. G. Fiedler (Yadnarie).]

A good stable should be provided, or where this is not available at least some kind of shelter from rain and weather. The mangers should also be under cover.

Horses should be fed and watered regularly and at least three times a day. They should be given enough feed, but not more than they can clean up from one feeding to another, because horses do not like stale feed. Fowls are a menace in the mangers and should be kept out as much as possible.

The horses' teeth need attention occasionally; they may have sharp points which need filing down. This can be done easily enough with the aid of a mouth gag. If a horse should happen to be staked, the stake should be extracted immediately and then either spirits of salt or eucalyptus applied to it. Cotton wool should then be put in the hole to keep out any dirt.

Horses should not be worked late at night, as this does not give them a chance to dry and if there is any draught they are likely to catch a chill. Horses should be groomed every morning when working, as the sweat and dust from the previous day seems to make them lazy and irritable. "Sore shoulders" is a common complaint among horses, but is often due to ill-fitting collars or lack of care. The shoulders should be watched closely and as soon as a sore appears it should be checked. This can often be done by adjusting the hames or, if the collar is too big, by placing a folded piece of bag underneath it on top of the neck. If a collar fits a horse perfectly it should not be worked on another horse, as this is likely to pull it into a different shape.

Some horses have exceptionally soft shoulders and it is difficult to prevent them getting sore. In such cases a breast plate could be used until the shoulders are healed. Collars lined with soft sponge rubber have been found successful on some horses. Great care must be taken with young horses, as their shoulders are very tender and will scald very easily. They should be given only light work and short yokes until they become more used to it and their shoulders harden.

When turning corners while working care should be taken that the horses do not step on each other's feet. Swings should be made wide enough to prevent chains from rubbing. Rubbing can also be prevented by wrapping a piece of sheepskin round the chain.

The Removal of Spray Residue from Apples and Pears

[By A. G. Strickland, M.Agr.Sc., Chief Horticulturist, and R. Fowler, Manager Blackwood Experimental Orchard.]

The necessity for using sprays of various kinds in order to protect ripening fruit from insects and diseases is universally recognised.

Such sprays are customarily applied at certain intervals during the growing season, often up to a few weeks before the fruit is harvested, and despite natural weathering, some of the applied spray must be present in greater or less amount on the harvested fruit.

The presence of spray residue on marketed fruit is objectionable, firstly because of its adverse effect on the general appearance of the fruit, and secondly because the arsenic content of the fruit may exceed the legal maximum prescribed by Health Regulations in the United Kingdom and elsewhere, *i.e.*, 0.01 grains of arsenic trioxide per pound of fruit. In order to conform with such regulations it has been found necessary to reject for export any fruit which shows visible spray residue.

Prevention is ever better than cure, and before discussing methods of cleaning spray-marked fruit short reference will be made to possible methods of avoiding excessive residue. The tendency for lead arsenate sprays to leave an objectionable residue has prompted extensive trials of other spraying materials for codling moth control, but although many substitutes have been tested, no spray has yet been devised that will universally replace arsenate of lead. This season, the Department of Agriculture has incorporated in spraying trials in the Mount Lofty Ranges, Barossa district, and Murray River areas, plots treated with two promising new materials; these materials are non-arsenical, harmless to human beings, and in preliminary overseas tests are stated to have given control of codling moth approaching that obtained with arsenate of lead. The showing of these materials in South Australian trials is awaited with great interest.

White Oil emulsion, following earlier calyx sprays with arsenate of lead, has given better results in moth control and deduction of residue than any other substitute for arsenicals so far tested. Used under South Australian conditions, however, on delicate green-skinned applies, such as Cleopatra, white oil sprays are dangerous, and growers are advised against them until further investigation has been made. In spraying experiments conducted at Blackwood last season, a white oil programme resulted in oil injury of 70 per cent. to 80 per cent. of the crop. Figure 1 shows a typically affected fruit. It is of interest to note that Jonathan apples sprayed with the same schedule as the Cleopatra fruit shown in Figure 1 sustained no apparent oil injury.

Where harvested fruit still bears excessive residue in spite of the use of oil sprays in substitution for some of the arsenical

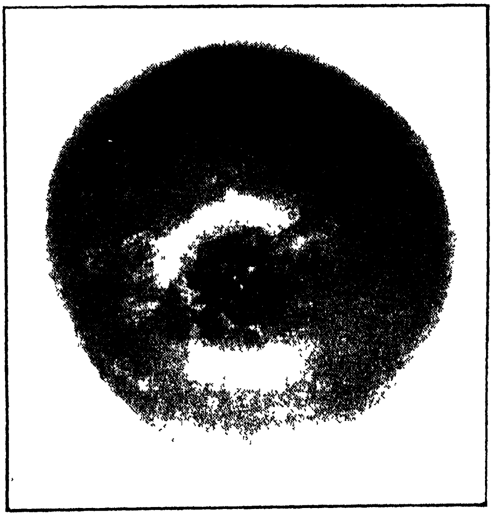


Fig. 1.—Oil injury following application of schedule of white oil sprays to Cleopatra

applications, the fact that oil has been applied greatly complicates the problem of removing the residue. A residue of arsenate of lead may be removed with comparatively little difficulty, but if such a residue has been coated with a film of oil it is not so easily dispersed. If White Oil is included in the spraying schedule on red varieties such as Jonathan, and such inclusion does not satisfactorily avoid residue, then in the interests of removing the spray marks, it is far better to omit the oil altogether. Most trouble in this respect is experienced, when, after putting on several sprays of lead arsenate and achieving a fairly heavy residue, the orchardist optimistically closes his spraying season with oil. This practice seldom has the effect of dispersing the spray deposit, and serves merely to render the fruit unhappily resistant to any cleaning process which may be employed.

Generally speaking, a complete schedule of lead arsenate sprays will leave more or less residue, depending on weather conditions and methods of spraying. The subsequent removal of this residue is often facilitated by the addition of 1lb. to 2lbs. of hydrated lime per 100galls. of lead arsenate spray when making the final applications. Growers are advised to add this lime to the last spray of lead, when it seems likely that they will have to take steps to remove the residue after the fruit is picked.

In the past, hand wiping has been employed extensively to remove excess spray, but even under the best conditions this method is inefficient. Wiping does not remove residue from the cavity and basin of the fruits, where the greatest concentration of arsenic usually occurs, and most growers know by experience that it is a laborious and costly process. Recently several types of wiping machines have been placed on the market, but although speedier, these machines are still inefficient, and some types result in puncturing and injury of the skins of fruit.

Removal of the spray residue by means of washing the fruit in a suitable chemical medium is cheapest and most effective, and the washing method is used extensively in other countries and States.

Fruit Washing Experiments.

Many different chemical washing media have been tested for removal of arsenical residue; some such materials have shown very inefficient removal, and others, whilst effectively removing residue, have resulted in considerable fruit injury. Two of the many possible materials only need be considered at this juncture, viz.., dilute hydrochloric acid and a solution of sodium silicate or waterglass. Experiments with these two solutions have been carried out at Blackwood Experimental Orchard during the past two seasons, and as the following summarised results will show, dilute hydrochloric acid may be regarded as an efficient and safe remover of residue. Certain precautions are essential when hydrochloric acid is used on varieties of apples having an appreciable percentage of open calyx tubes—such as Cleopatra—but it is more efficient than sodium silicate, and furthermore, although cost of material is not a big item, it is cheaper.

Results of Experiments in 1935-36.

Residue Removal.

Cleopatra and Jonathan apples were obtained from experimental plots sprayed according to the following schedules:—

(1) Six sprays of lead arsenate, 4lbs. per 100galls.

(2) Six sprays of lead arsenate, 6lbs. per 100galls.

(3) Two sprays of lead arsenate, 4lbs. per 100galls.; followed by four sprays of lead arsenate, 2lbs., plus White Oil, ¾gall. per 100galls.

(4) Two sprays of lead arsenate, 6lbs. per 100galls.; followed by two sprays of lead arsenate, 4lbs. per 100galls.; followed by two sprays of lead arsenate, 3lbs., plus Red Oil, ½gall. per 100galls.

Representative quantities of fruit were hand-washed according to methods detailed in recommendations at the conclusion of this article, with various solutions; we will only consider dilute hydrochloric acid and sodium silicate (or waterglass), as other solutions utilised showed no advantages over these two. Thorough rinsing with fresh water after treatment with acid or sodium silicate was uniformly applied. In Table I. analyses of samples taken before and after washing indicate the relative efficiency of the two solutions above mentioned.

TABLE I.—*Analyses of Washed and Unwashed Fruit.*

Spray Schedule.	Variety	Grains of AS_2O_3 per lb. of fruit.		
		Unwashed.	Washed in 1% Hyd. Acid.	Washed in 8% Sodium Silicate.
		%	%	%
(1)*	Cleopatra	0·0196	0·0098	0·0121
	Jonathan	0·0252	0·0092	0·0075
(2)*	Cleopatra	0·0214	0·0001	0·0152
	Jonathan	0·0257	0·0075	0·0114
(3)*	Cleopatra	0·0225	0·0050	0·0087
	Jonathan	—	—	—
(4)*	Cleopatra	0·0137	0·0024	0·0151
	Jonathan	0·0307	0·0109	0·0149

* Key to spray treatments shown in text above.

From a study of Table I. it will be seen that all spray schedules resulted in fruit having arsenical residue exceeding the tolerance. It further emerges that, after making due allowance for a technique of sampling for analysis which left something to be desired, dilute hydrochloric acid was effective in reducing the residue to below the tolerance of 0.01 grains of arsenic trioxide per pound of fruit, and 8 per cent. sodium silicate solution was scarcely as effective.

Effect of Washing Treatment on Keeping Quality.

In order to determine the effect on keeping quality of the various washing treatments, fruit washed in several ways was submitted to a storage trial. Sufficient fruit was held in cool store to enable two-case units of fruit under different treatments to be withdrawn from store and examined at fortnightly intervals over a period of three months. After withdrawal from cool store, units were held at ordinary atmospheric temperature for two weeks before examination.

During storage, the fruit from all treatments showed no disorders or blemishes other than mould development, of which mouldy core comprised the major type; further, mouldy core only proved troublesome in the case of Cleopatras subjected to certain methods of washing. The results are summarised in Table II.:—

TABLE II.—*Storage Trials on Washed Apples.*

Period of Storage.	Variety.	Mean Percentage of Fruit affected with Mould (Chiefly Mouldy Core) during the Storage Period.				
		Unwashed.	Washed 1% HCl Deep Immersion (1).	Washed 1% HCl Shallow Immersion (2).	Washed 1% HCl Shallow Immersion followed by Rinsing in Lime water (3).	Washed 8% Sodium Silicate.
14 Weeks	Cleopatra	Nil	11·82	2·45	0·61	0·12
	Jonathan	Nil	Nil	0·72	Nil	Nil

(1) Apples immersed in acid solution to maximum depth of 12in. to 14in.

(2) Apples immersed in acid solution to maximum depth of 6in.

(3) Apples immersed in acid solution to maximum depth of 6in, then immersed to maximum depth of 12in. to 14in. in lime water before final rinsing

From Table II. it is seen that neither dilute hydrochloric acid nor sodium silicate washes have adverse effect on the keeping quality of Jonathan apples. Applied to Cleopatras without due precautions, however, the former solution (HCl) may lead to mould attack of a proportion of fruits. Such mould attack is chiefly of the mouldy core type (see Fig. 2), and follows as a result of penetration of the acid solution through the open calyx tubes generally characteristic of a percentage of individual Cleopatra fruits. Mould spores are always present to same extent in wash water, and the penetration of acid solution provides favourable environment for the rapid growth of mould (notably *Penicillum* sp.) near the core. The non-development of mouldy core where open calyx-tubed apples have been washed with sodium silicate is due to the fact that this latter solution has an alkaline reaction, and does not favour the growth of the particular moulds concerned.

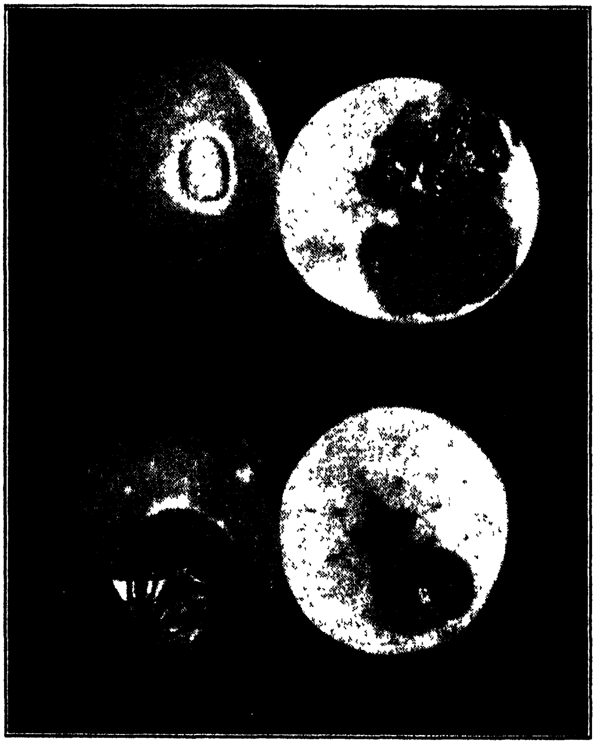


Fig. 2.—Mouldy Core, due to Penicillum spp. following deep immersion of Cleopatra apples in 1 per cent. Hydrochloric Acid.

Table II. shows that by immersing Cleopatra apples in acid solution to a depth not exceeding 6in., mould losses may be appreciably reduced; further, that by following the acid wash with immersion of the fruit in a lime water bath such mould attack may be reduced to negligible proportions.

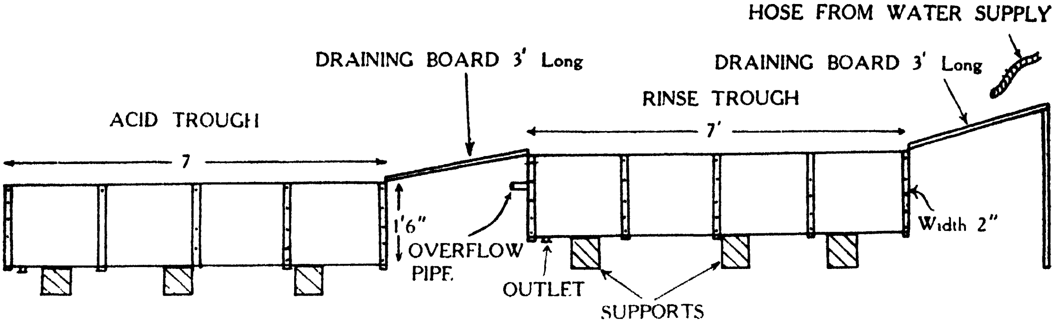
By means of ensuring shallow immersion, a grower in the Barossa area (Mr. H. F. Lock) has successfully applied the dilute hydrochloric acid dip to Cleopatra apples.

Recommendations for Removal of Residue.

In the course of time the use of washing machines at central packing sheds may become more general, but at present the individual grower has, in most cases, to deal with his own fruit, washing or wiping it free from residue before packing or delivery to the packing shed. If an adequate water supply is available, hand washing in dilute hydrochloric acid is recommended.

Equipment and Materials.

Hand washing with hydrochloric acid may be performed in wooden troughs (or even half casks) adapted to suit the particular requirements of individual growers; the troughs may be designed to take one case of fruit at a time, or lengthened to take a number of cases, which are floated through the trough at a rate consistent with immersion of the fruit for the required period. Fig. 3 shows a system of troughs designed to deal with three cases simultaneously in each trough, and Fig. 4 an alternative system suitable for shallow or deep dipping that will accommodate two dump or kerosene cases simultaneously, or one long bushel pear case, and can be economically worked by two men.



["Journal of Agriculture," Victoria.

Fig 3.—A system of dipping troughs designed to take three dump cases simultaneously.

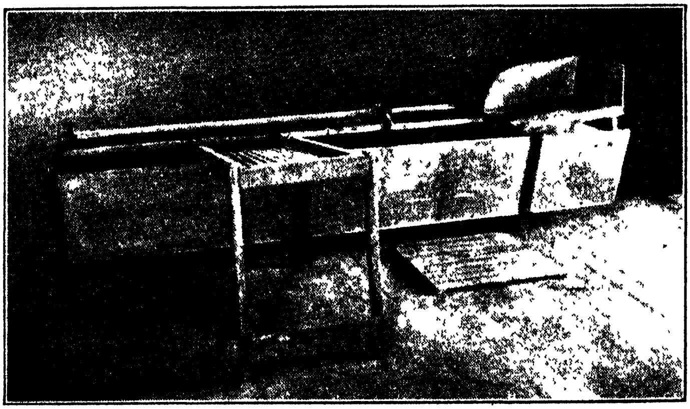


Fig. 4.—An alternative system of dipping troughs.

Two troughs are necessary—one for acid treatment, the other for rinsing after treatment—and these must be constructed of wood or other acid-resistant material. A draining board is required between the acid and rinsing trough (sloping to the acid trough), and another at the exit end of the rinsing trough.

The acid trough should contain a solution of 1gall. to 3galls. of commercial hydrochloric per 100galls. of water—the strength of acid being varied within the above-mentioned range according to the density and tenacity of the residue to be removed.

The rinsing trough must be of at least the same capacity as the acid trough, and equipped to permit of a constant change of rinse water: this may be achieved by entering water through a hose used for douching of cases on the final draining board, and providing an overflow outlet at a convenient height.

The Washing Solution.

Commercial hydrochloric acid (S.G. 1.2) at the rate of 1gall. per 100galls. of water will remove most residues. Particularly resistant residues resultant upon use of oil sprays, or such as are found on certain waxy varieties of apples, or upon fruit which is held for some time before washing, may require up to 3galls. of commercial acid per 100galls. of water. The lowest strength of acid consistent with efficient removal should be used.

Hydrochloric acid will attack metals, clothes, &c., and great care is necessary in handling, particularly the concentrated form. Earthenware or wooden containers should always be used, and a supply of concentrated baking soda solution kept at hand with which to neutralise any strong acid splashed on hands, face, &c.

As fruit passes through the acid trough, gradual loss of solution will take place—this loss should be made good from time to time with solution of the correct strength. Besides loss of acid solution through splashing, absorption by cases, &c., the actual strength of the solution decreases after a considerable quantity of fruit has passed through. This decrease in strength will be evidenced by failure of the bath to remove residue effectively, and under such circumstances, small quantities of undiluted commercial acid may be added to bring the bath back to the stage where it again becomes effective. Usually, however, it will become necessary, on account of other considerations, to entirely replace the acid bath by fresh solution before it loses appreciably its powers of residue removal. As fruit passes through the bath, dirt, rubbish, and—more important—mould spores accumulate in the acid solution; an appreciable concentration of mould spores is highly undesirable, and it is recommended that the acid wash solution be renewed completely after washing 1,000 cases of fruit per 100galls. of solution.

Rinsing Water.

The essential feature here is that continuous change of water should take place, and failing a constant water supply on the site, the orchard spray cart can be often adapted to provide running water. For treatment of varieties with open calyx tubes, such as Cleopatra, it is recommended that the rinsing water be charged with 10lbs. of slaked lime per 100galls. of water; in such case the rinse water will not circulate. Whether the rinsing trough contains circulating *fresh* water, or (as in the case of varieties prone to open calyx tubes), lime water, a final douche from a hose is essential.

Containers for Fruit.

Fruit should be passed through the baths in cases which have sufficient space between boards to enable rapid and complete drainage; for this reason, certain types of kerosene boxes are unsuitable.

Apples which have definitely closed calyx tubes (*e.g.*, Jonathans, Granny Smith, &c.) and pears may be conveniently washed in dump boxes or kerosene boxes, provided that the latter are remodelled to give quick drainage.

Apple varieties with open calyx tubes (*e.g.*, Cleopatra, Delicious, London Pippin) must not be immersed deeply in the acid bath, and therefore dump or kerosene cases are unsuitable for washing such varieties. Flat cases, such as the long bushel pear case used on the side, must be used for these varieties, the aim being to avoid submersion of the bottom layer of fruit to a depth exceeding 6in.

Loose-fitting lids, either lightly nailed or otherwise temporarily affixed to cases are necessary to prevent apples from floating out of boxes whilst in the acid or rinse trough. Most varieties of pears are heavier than water, and lids are not required for boxes when dipping such fruit.

Procedure.

Fruit should be washed as soon after picking as possible, owing to the fact that in the course of time a protective coating of wax is developed by many varieties; this coating impedes the action of the acid, and makes cleaning very difficult. All decayed and bruised fruit should be excluded from cases which are to pass through the bath.

The period of immersion of fruit in the acid solution (1 per cent. to 3 per cent. according to type of residue being dealt with) should be approximately two minutes. Up to four minutes' exposure to 1 per cent. acid is quite safe, but in order to speed up the rate of treatment it is usually preferable to fix on a period of two minutes' exposure, and increase the strength of acid as required up to a maximum of 3 per cent. Where troughs of more than one case capacity are utilised, a system can be worked out whereby each case spends the allotted time in the acid bath between entry at one end and removal to the centre draining board at the other. Cases should be gently plunged up and down whilst in the solution. Reference has already been made to the necessity of using shallow boxes or trays, and avoiding deep immersion for Cleopatras, Delicious, and other open calyx-tubed varieties.

After removal from the acid bath the fruit is allowed to drain for a short time on the centre draining board before entering the rinsing trough. In the rinsing trough the cases are vigorously plunged up and down before proceeding in due course to the final draining board, where they receive a final douche of water from a hose.

The necessity for adequate rinsing of fruit after acid treatment cannot be overstressed. Provided that rinsing is thoroughly carried out (and open calyx-tubed varieties of apples not dipped deeply), the method of residue removal under consideration cannot harm fruit in any way. However, if rinsing is negligently performed, injury to fruit can occur, one type of such injury being shown in Fig. 5.

From time to time the efficiency of rinsing should be checked by the simple procedure of applying the tip of the tongue to the calyx cavity of a number of fruits as they leave the final rinse. If a sharp, stinging sensation is experienced on the tongue this may be taken as an indication of insufficient rinsing.

As previously mentioned, Cleopatras and other open calyx-tubed varieties should be *shallow dipped* in acid and *deep dipped* in a rinse bath containing 10lbs. hydrated lime per 100galls. of water. Where the lime water rinse is used, douching with running water from a hose will effectively remove any lime carried over on the surface of the fruit.

Special provision for drying is not necessary, the average temperatures and humidities experienced in South Australia during the harvesting period being generally such as to ensure rapid drying of the fruit.

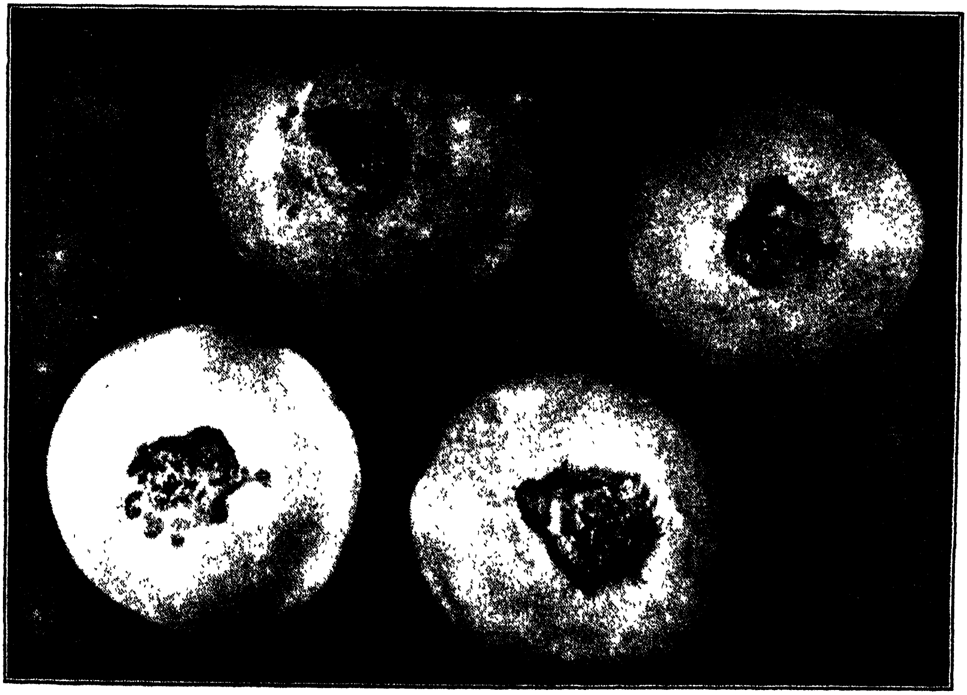


Fig. 5.—Calyx injury occurring as a result of insufficient rinsing after acid treatment.

Tubercle-Free Herd Scheme

With a view to encouraging the establishment of tuberculosis-free stud dairy herds in this State, a scheme has been drawn up whereby studowners may apply to have their herds tested free of charge by veterinary officers of the Stock and Brands Department, subject to the conditions laid down for the scheme and to an agreement to that effect being entered into by such owners with the Chief Inspector of Stock. The conditions of the scheme are set out below.

The names of owners of herds qualifying to be accredited as tubercle-free will be published in this *Journal* with the following particulars:—

Name and address of owner, number of cattle tested and expiry date of the certification (the expiry date will indicate the time the certification remains in force, unless otherwise declared.)

1. All cattle shall be subjected to such tests as may be specified by the Chief Veterinary Officer.

2. The tests may be carried out by a Government veterinary officer or a veterinary surgeon approved by the Chief Veterinary Officer.

3. All cattle reacting to the test shall be removed from the herd by arrangement with the owner and such arrangement may vary in accordance with the decision of the Chief Veterinary Officer.

4. If the herd is found clean on first test, it is to be declared tubercle-free, after which the herd will be retested every second year at the discretion of the Chief Veterinary Officer.

5. If one or more reactors are found:—

   (*a*) A retest of the herd shall be made six months later.

   (*b*) The whole herd will be retested every 12 months until two clean tests have been completed, after which testing will be carried out every second year at the discretion of the Chief Veterinary Officer.

   (*c*) The herd will not be declared tubercle-free until it has passed a clean test.

6. No cattle which have reacted to the test shall be submitted to retest.

7. All cattle to be introduced into the tubercle-free herd shall be tested before introduction by a Government veterinary officer or approved veterinary surgeon, or shall be effectively isolated as directed by a Government veterinary officer until such testing is completed.

8. Any animal from a tubercle-free herd which is allowed to run in contact with untested cattle shall be retested before being reintroduced into the tubercle-free herd.

9. No milk shall be sold by the owner of this herd except that obtained from animals tested under the tubercle-free herd scheme of the Department.

10. A system of individual indentification marks to be arranged between the veterinary officer carrying out the test and the owner of the herd, but to the satisfaction of the veterinary officer, shall be applied to the animals tested.

11. This agreement may be cancelled at any time by the owner of the herd or the Chief Veterinary Officer.

Modern Methods of Incubation

Electric Incubators were recently installed at the Parafield Poultry Station and incubations on a large scale have been carried out on behalf of the settlements under the control of the Employment Promotion Council. In the accompanying article Mr. Anderson describes the equipment and discusses the extent and results of this season's hatching.

[C. F. ANDERSON, Chief Poultry Adviser.]

After three years of operations with the keeping of poultry on the Land Settlement Activities of the Employment Promotion Council, further consideration was given to the methods to be adopted for the annual restocking of the poultry on these blocks.

At the present time there are 70 settlers under the control of the Council, and they are divided among five settlements. At Echunga, including Jupiter Creek, there are 13 settlers, at Bridgewater 4, Yundi 19, Meadows 24, Montarro 10. For the 1936 season 66 settlers were restocked.

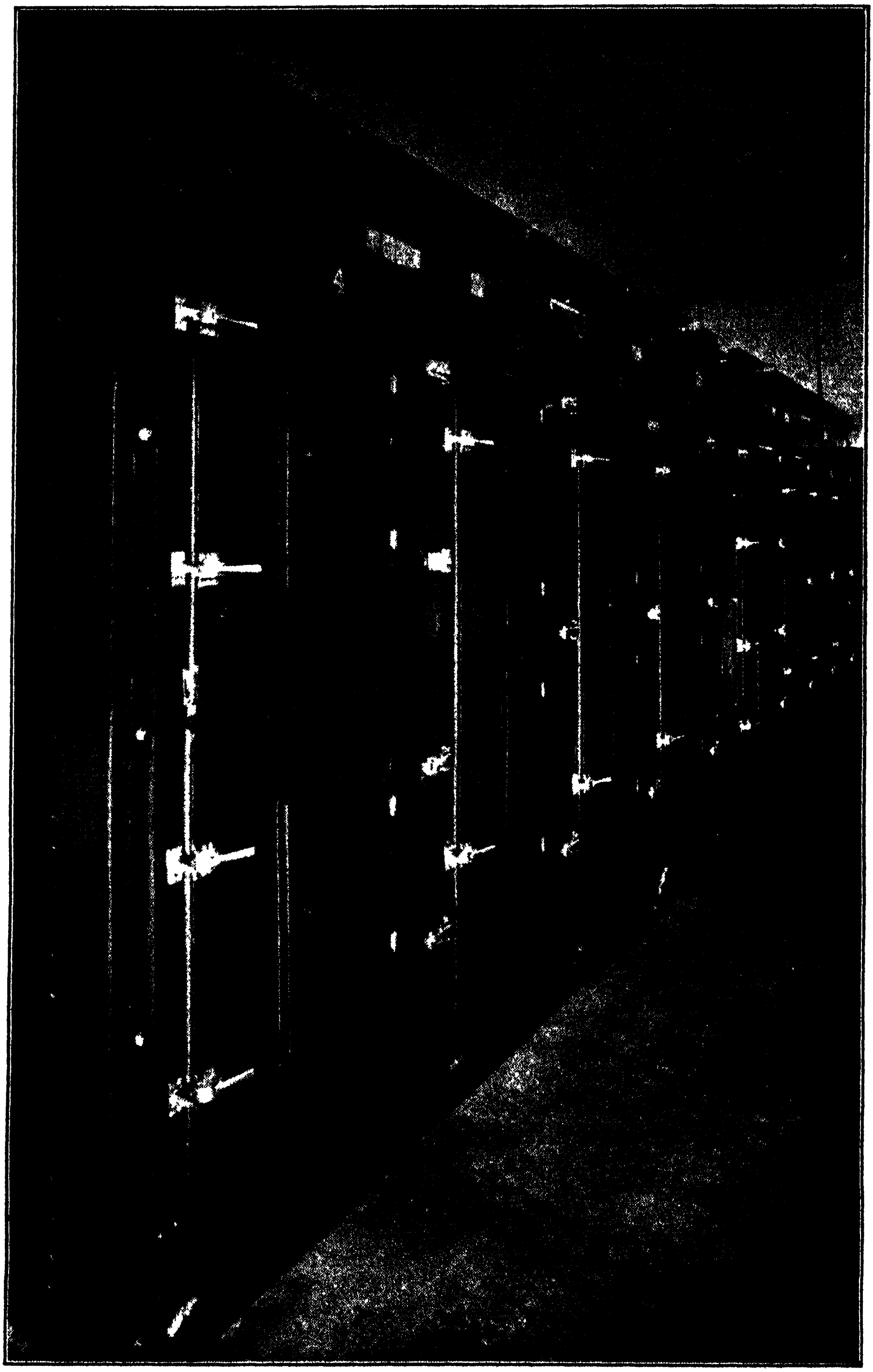
For the first three years of the establishment of these settlements pullets at from eight to 10 weeks of age were supplied to the settlers. These pullets were obtained from private breeders. With gradual development the time was reached when it was deemed advisable by the Employment Promotion Council to consider other means for the annual restocking of these blocks. Although the purchase of pullets during the inital stages was satisfactory, the practice obviously could not be followed indefinitely. During the first three years when a large amount of clearing, fencing, &c., had to be done, and bearing in mind the lack of knowledge and experience of keeping of poultry on the part of the settlers, the question of rearing stock by the settlers could not be considered.

The districts where these settlements are established are all in good rainfall areas, cool climates, with regular supplies of suitable greenfeed. The climatic conditions are also very suitable to the successful keeping of poultry. In the matter of restocking, it was decided that provision should be made for the supply of sufficient day-old chickens to enable each settler to rear 300 pullets a season.

Selection of Stock.

The settlers already had sufficient stock from which suitable breeding hens could be selected, and during the previous 12 months the settlers had entered in the Parafield Egg Laying Competition from 3 to 6 White Leghorn pullets for a 12 months' test, with the ultimate object of breeding stud cockerels for future use. Each pullet that laid 200 first-grade eggs, or over, was retained for breeding. For the purposes of this competition first-grade eggs are classed as follows:—For the months of April and May a first-grade egg must be of a minimum weight of 1¾ozs., month of June a minimum of 1⅞ozs., and from 1st July to the 31st March, that is, the termination of the test, a minimum of 2ozs. in weight. From these hens sufficient cockerels were bred for the settlers' requirements. The object of using these pedigree cockerels was to improve the general producing qualities of the stock with particular reference to the size of the egg. As the great bulk of the eggs produced on these settlements is exported overseas, the maintenance of the size of the egg is most important. It will be seen that the methods adopted in breeding for this season were to select suitable hens and then mate them with pedigreed cockerels.

The climate in the districts where the settlers are situated is very suited to the production of eggs of the very highest quality. For the 1936 spring hatchings only breeding stock at Yundi, Echunga, and Bridgewater settlements were used. These settlements supplied all the eggs required for the five settlements. On these settlements 75 of the best hens were selected from each settler's birds, and 5 of the pedigree cockerels were mated with them. No hen that had not completed one full season's laying was used as a breeder.



The two Lanyon All-Electric Incubators each of 17,304 egg capacity. Compartments numbered 1, 2 and 3 are egg compartments, while those marked 4 are hatching compartments.

The supply to the 66 settlers necessitated the hatching of a very large number of eggs, and the basis of the Scheme from a hatching point of view was as follows:—

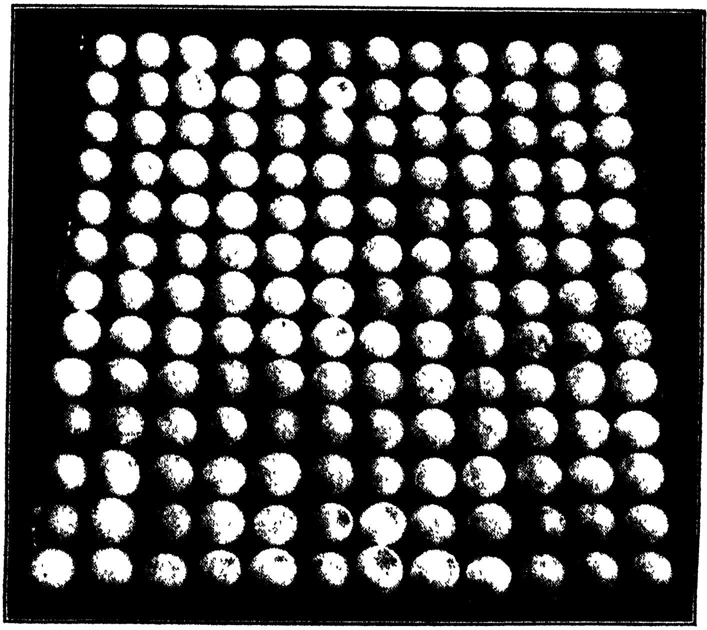
The requirement of each settler was based on 300 pullets. As none of the settlers had any previous experience in the rearing of large numbers of chickens it was estimated that in order to rear to the adult stage 300 pullets, sufficient chicks, a day old, for the supply of 400 pullets would be supplied. This was allowing for a 25 per cent. loss in rearing. Therefore, in order to supply 400 pullets to each settler a total of 800 day-old chicks was necessary. That was allowing for a 50 per cent. cockerel hatching. In order that 800 chickens could be hatched for each settler it was estimated that it would be necessary to set 1,400 eggs for each settler, or a total of 92,400 eggs to be set for the season.

Method of Hatching.

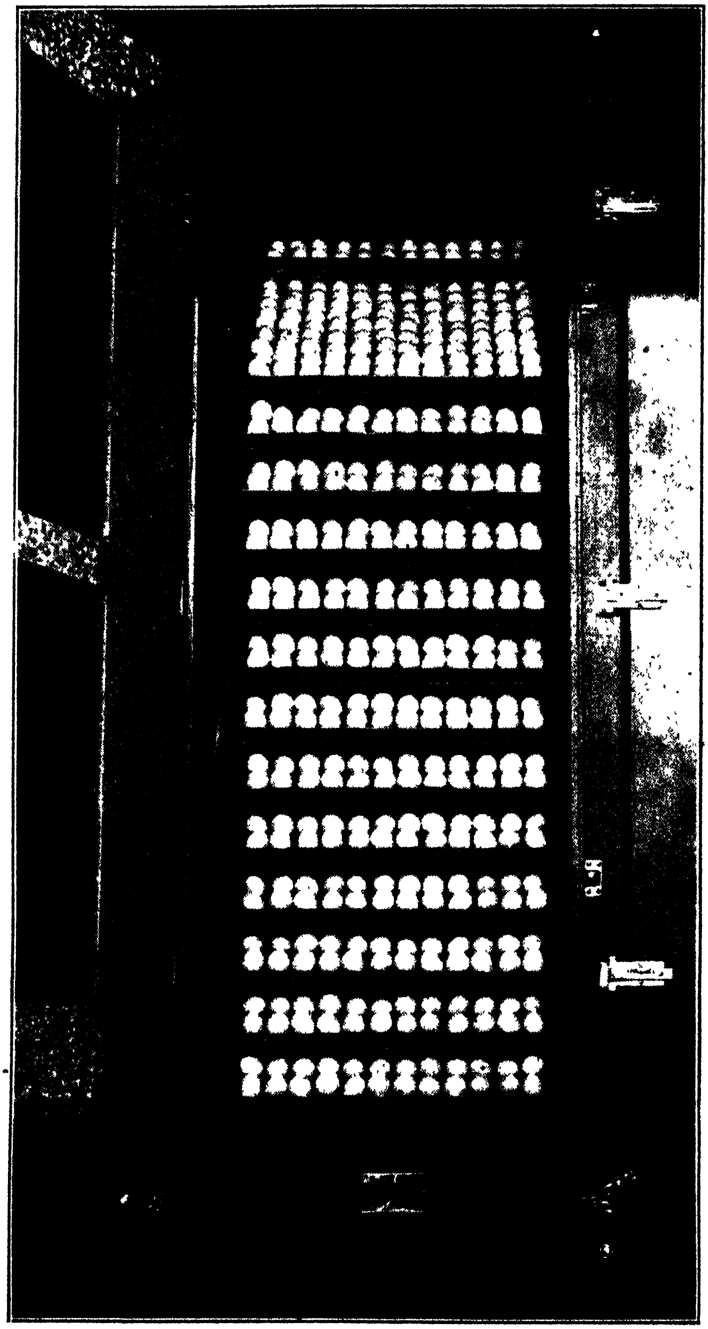
In order to hatch this large number of eggs, the Employment Promotion Council decided to instal two all-electric incubators, each of a capacity of 17,304 eggs, or a total capacity of 34,608 eggs. These machines were installed at the Parafield Poultry Station, and for the convenience of this article one machine is referred to as the Monday machine, and the other as the Thursday machine.

Particulars of the Machine.

Each machine was divided into four separate compartments, three egg compartments were used for the incubation of the eggs up to the eighteenth day, and one compartment solely as a hatching compartment. In a long experience of electric incubators the writer has found the benefits of having the hatching chamber as an individual unit, separate from the egg chamber. Each egg compartment had a capacity of 28 trays, each tray was a standard size of 156 eggs, or a total capacity of 4,368 eggs for each section. The hatching compartment was of 28 trays each of 150 egg capacity, or 4,200 eggs, and in the Monday machine one complete section was set each Monday. The eggs remained in the egg chamber for 18 days, when they were transferred to the hatching compartment. A similar procedure was followed with the Thursday machine, that is, one complete section was set every Thursday and remained in the egg compartment until the eighteenth day,



Standard size egg tray; capacity 156 eggs, each egg in a separate square.



Interior of one side of egg compartment, showing eggs in one turning position, also position of air agitator. The egg trays are of same capacity, each holding 156 eggs.

when they were transferred to the hatching compartment. The construction of each machine was identical, both with regard to capacity of trays, method of heating, regulation, &c. So, therefore, chickens were hatching twice a week, that is, on every Tuesday and Friday chickens were available for distribution to the settlers.

Transport.

In order to facilitate the delivery of eggs from the settlers to the hatching centre at Parafield, also the return supply of chickens from Parafield to the settlers, a trailer was purchased and the eggs were brought to Parafield twice a week in the trailer and chickens returned.

Commencement of Hatching.

On account of the large number of eggs the machines were built so that the requirements of the settlers could be supplied by three complete runs of each machine.

Months of Hatching.

For climates similar to those in which the settlers are situated the three most suitable hatching months are July, August, and September. There is, however, a little difficulty in getting very heavy production from the birds in the early part of the season, owing to the seasonable conditions being from three to four weeks later in those districts than is the case in the suburban and northern districts of the State. However, the first machine, that is the Monday machine, was started on the 29th June, and the Thursday machine was started on the 2nd July.

Workings of the Incubators.

As will be realised by the magnitude of the operations undertaken, every precaution was necessary to avoid a breakdown in the Scheme, for it was realised that if the hatching of this large number of eggs and the subsequent rearing by the settlers were reasonably satisfactory such precautions would be a very big step forward in the successful operation of the Scheme. With that object machines were built which it was considered would be most suited to the conditions in this State, and they were constructed locally.

Description of the Machines.

The following particulars give the capacity of each incubator, how it is operated, and its general construction:—

Description of Each All-Electric Incubator.

	Eggs.
Capacity	17,304
Total setting space—	
3 sections each of 28 trays, each tray holding 156 eggs	13,104
Hatching compartment—	
28 trays each of a capacity of 150 eggs .	4,200
Total	17,304

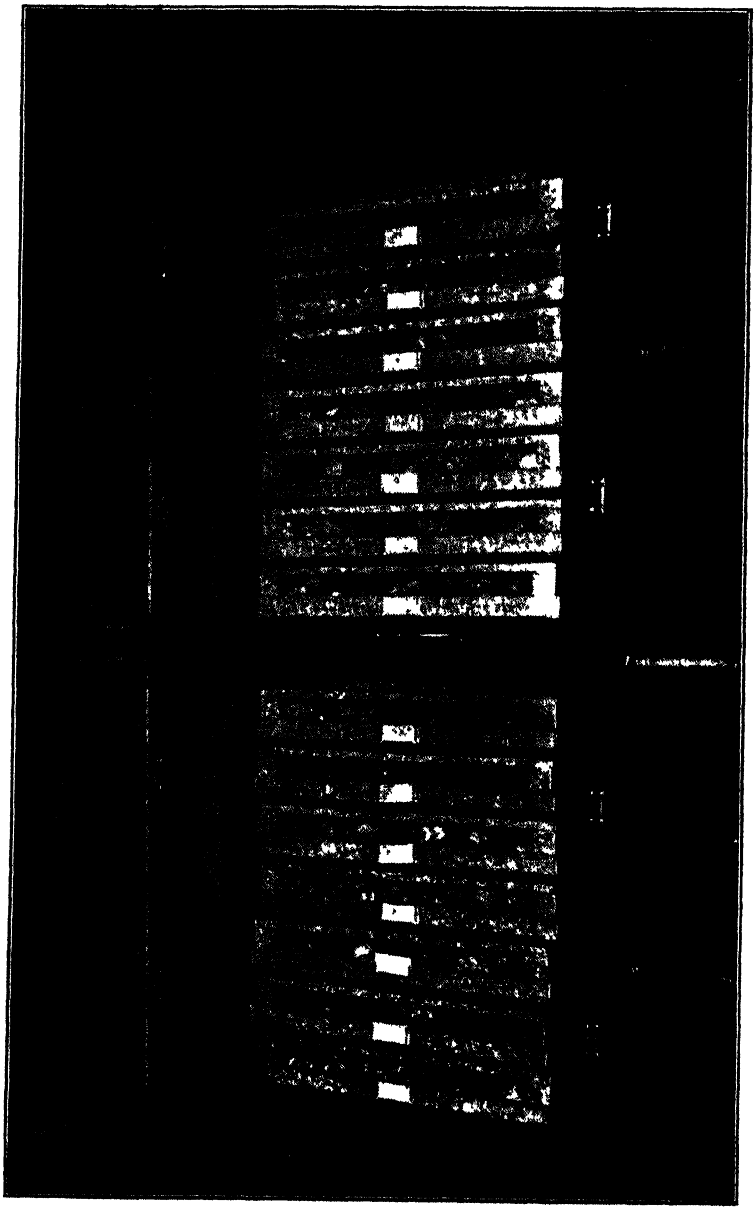
Size of Incubator Cabinet—

	Ft.	In.
Length	11	2
Width	5	3
Height	7	0
Size of each egg chamber	2	5½
Size of each hatching chamber	2	11

The hatching chamber was built larger than the egg chamber so as to increase the amount of air circulating during the hatching period. With a hatching capacity of 4,200 eggs sufficient air circulation in this compartment was of great importance. Each hatching compartment was provided with two movable racks each holding 14 trays of 150-egg capacity. All hatching trays are collapsible for cleaning, and are constructed throughout of galvanized metal. Each hatching tray has a cover, this precludes any possibilities of chicks getting from tray to tray.

Heating.—Each compartment was individually heated and regulated; if only one compartment was required then only one was heated. Thermostatic control was used. Each thermostat had incorporated a current breakdown and an overheating indicator which worked in conjunction with an electric bell. The air agitator of each hatching compartment is detachable so that cleaning operations in the hatching compartment can be carried out without disturbing the air movement in the incubation compartments.

Transmission.—The air in each compartment is agitated and circulated by means of a suitable agitator. The agitators for the three egg compartments are mounted on a common shaft or axle. This axle is rotated by an electric motor mounted on the top of the incubator on one end of the cabinet.



Interior view of hatching compartment, showing the 14 trays in position on rack

Incubation Compartment.—Three incubation compartments are provided. These are transverse sections of the cabinet, and are provided with a door to each side. Behind each door is a turning rack into which are fitted 14 trays each containing 156 eggs. These trays are constructed entirely of metal, and each egg occupies a small square, so that the eggs do not touch. The turning rack is of heavy metal supported by suitable mountings; the turning racks are coupled to an outside lever for turning purposes. The racks are of swivel-type construction, making the egg-turning operation easy and steady.

The cabinet was constructed of Californian Red Pine, the interior being lined with metal to prevent moisture penetration.

The Scheme has also enabled very interesting information to be obtained concerning the percentages of infertility, dead germs, hatchings, &c., during the three principal hatchings of July, August, and September.

Working the Machine.

Firstly, it should be understood that for successful incubation the class of stock is really the starting point, and when studying the figures I would impress upon the minds of readers the necessity of taking into account the large numbers of eggs and chickens that are being dealt with. Percentages in some cases may not appear high, but when the total number of eggs (87,193) that were set for the season is taken into account, I consider that the results were quite satisfactory.

The selection of the breeding stock was done most rigidly. No bird under 2 years of age was selected as a female, while the male birds were 12 months old. Every consideration was given to the type and size of bird, &c., as the principal object of these Schemes is for the production of eggs suitable for export. My experience has shown that, in order to obtain reasonable production consistent with size, quality, &c., it is essential that the size of the stock, particularly the hens, should be kept right up to standard for, generally speaking, once the size of the stock is allowed to go downwards, so the size and general qualities of the eggs follow.

Feeding.

There is one point I wish to emphasise particularly in this article—for some 12 months or more no pollard or wheat had been used on any of these settlements. One of the principal reasons for this was that when the price of wheat began to firm, naturally the cost of feeding on the settlement began to rise. At that time there were fairly large supplies of barley to be obtained, and it was decided to adopt this method of feeding. For many years the writer has been conducting experiments with regard to feeding of barley to poultry, and has no hesitation in saying that barley is a most suitable feed for all classes of poultry. The method of feeding adopted on the settlements is:—Morning, wet mash composed of 1 part of bran, 2 parts of crushed barley by weight, greenfeed varying in quantities from 30 per cent. to 60 per cent. according to the season, meat meal varying in quantity from ½lb. to 1lb. per 100 birds a day, together with charcoal, shell grit, &c. Mid-day and night, barley as a grain.

Very accurate records of all eggs set have been kept, and the various tables given from time to time can be accepted as a standard.

TABLE No. 1.

Total No. of eggs set for season		87,193
Total No. of eggs tested out first test..	12,299	
Total No. of eggs tested out second test	9,274	
	21,573	
Total No. of eggs transferred to hatching compartments		65,620
Total No. of chickens hatched for season		55,501

Monday Machine.

Date Set.	No. Eggs Set.	No. Eggs Transferred to hatching compartments.	Date Hatched	No. Hatched.
29/6/36	2,623	1,716	21/7/36	1,187
13/7/36	1,544	1,190	4/8/36	900
20/7/36	1,768	1.273	11/8/36	911
27/7/36	2,478	1,848	18/8/36	1,477
3/8/36	2,650	2,044	25/8/36	1,738
10/8/36	3,234	2.513	1/9/36	2,024
17/8/36	3,262	2,340	8/9/36	1,716
24/8/36	3.814	2,835	15/9/36	2,477
31/8/36	3.081	2,219	22/9/36	2,012
7/9/36	3,422	2,529	29/9/36	2,180
14/9/36	3,481	2,554	6/10/36	2,263
21/9/36	3,366	2,308	13/10/36	2.024
28/9/36	3,034	2.245	20/10/36	1,860
	37,757	27,614	—	22,769

Percentage chicks hatched from eggs set, 60·3 per cent.

Percentage chicks hatched from eggs transferred to hatching compartment, 82·4 per cent.

Monday Machine—continued.

	July Setting.	August Setting.	September Setting.
Percentage eggs transferred from egg chamber to hatching compartment	71·6	74·5	72·4
Percentage chicks hatched from eggs set	53 19	62·1	62·5
Percentage chicks hatched from eggs transferred to hatching compartment	74·2	83·3	86·4

Thursday Machine.

Date Set.	No. Eggs Set.	No. Eggs Transferred to hatching compartments.	Date Hatched.	No. Hatched.
2/7/36	2,313	1,686	24/7/36	1,248
9/7/36	2,472	1,902	31/7/36	1,487
16/7/36	2,060	1,604	7/8/36	1,199
23/7/36	3,609	2,809	14/8/36	2,355
30/7/36	3,486	2,743	21/8/36	2,418
6/8/36	3,529	2,756	28/8/36	2,503
13/8/36	3,693	2,916	4/9/36	2,565
20/8/36	3,939	3,079	11/9/36	2,698
27/8/36	3,948	3,064	18/9/36	2,588
3/9/36	3,967	3,130	25/9/36	2,786
10/9/36	4,083	3,237	2/10/36	2,918
17/9/36	4,341	3,389	9/10/36	3,054
24/9/36	4,047	2,881	16/10/36	2,516
1/10/36	3,949	2,810	23/10/36	2,307
	49,436	38,006	—	32,732

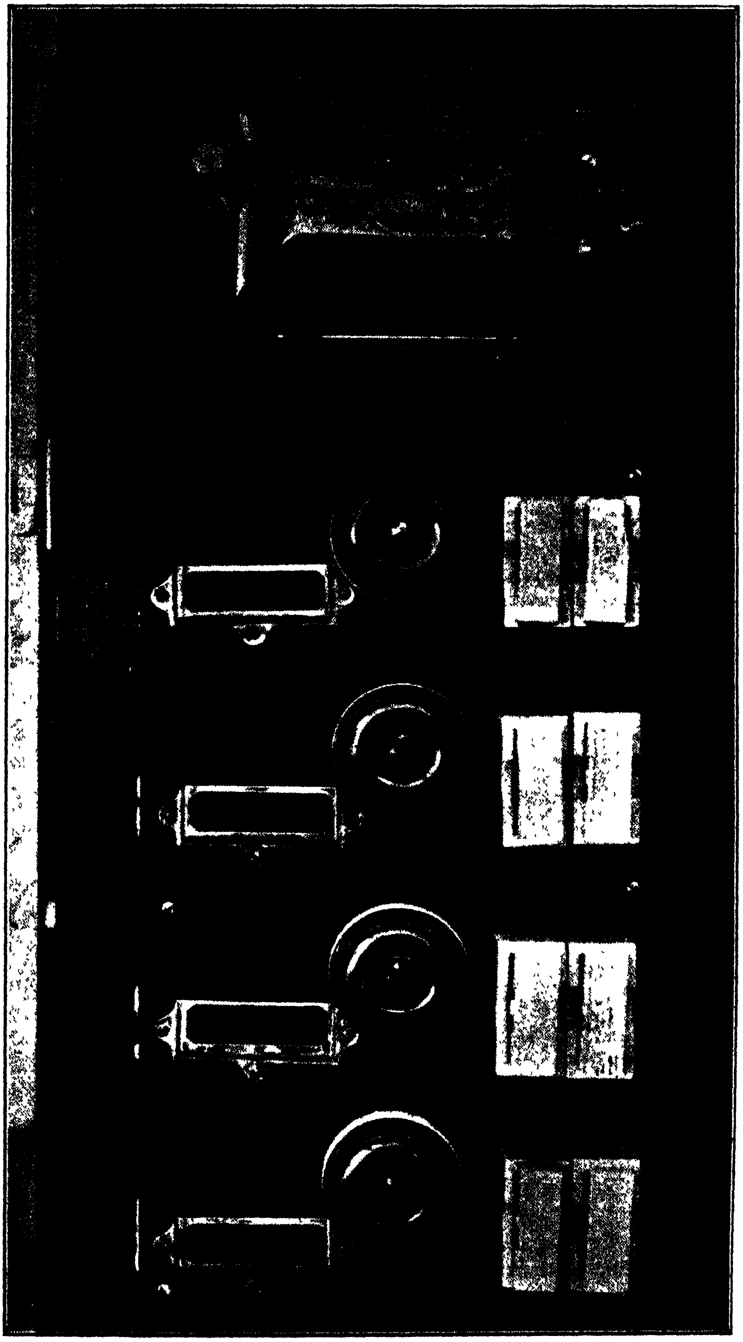
Percentage chicks hatched from eggs set, 66·2 per cent.

Percentage chicks hatched from eggs transferred to hatching compartment, 86·1 per cent.

	July Setting.	August Setting.	September Setting.
Percentage eggs transferred from egg chamber to hatching compartment . .	77·07	78·1	75·7
Percentage chicks hatched from eggs set	62·4	68·5	67·05
Percentage chicks hatched from eggs transferred to hatching compartment	81·04	87·6	88·5

Methods of Incubation.

As previously mentioned eggs were set on each Monday and each Thursday. The construction of the machine was such that each section of each machine was individually heated and controlled, that is, if one section only was required only one section was heated; if two sections were required, two sections were heated. In the working of the Scheme the delivery of chickens to the settlements was one of the primary factors that had to be considered and, naturally, the time which was required to commence the transport of the chickens was a guiding factor as to the time the eggs were set. Generally speaking, the settlements were approximately 35 to 45 miles from the Central Hatchery, and as these settlements were situated in cool climates the aim was to have the chicks arriving at the settlements between 3 p.m. and 4 p.m. so that they could be placed in the brooders and settle down before the cool of the night. In order to do this, with the Monday machine it was found advisable to set the eggs about 12 noon. When the season started the heat was switched on from seven to eight hours before the eggs were loaded, but experience showed that no advantage was obtained by this method, as, with the doors opened for the loading of the eggs, the temperature so gained was soon lost. The practice then adopted was to switch the heat on when the loading of the eggs was completed. It is interesting to note that the sections usually took from 8 to 9 hours to gain the normal incubation temperature after the eggs had been set. Therefore, with the Monday machine the aim was to commence unloading the chicks at 7 a.m. on Tuesday morning. This allowed time for the sexing of the chicks, the necessary boxing, and for the trailer to leave the hatching centre at between mid-day and 1 o'clock. With this object in view the eggs were generally loaded at noon on the Monday. For the Thursday machine the eggs were generally loaded between 3 p.m. and 4 p.m. on that day so that unloading the machine could commence at 7 a.m. on the Friday. After the eggs were loaded the machine usually took from 8 to 9 hours to reach the temperature at which these machines were run. At the commencement of the season the temperature was run at 100 degrees, but the hatching was a little late and protracted at this temperature. The heat was then increased to 101 degrees, at which temperature the hatch was up to time, the chicks dried off better and were a splendid lot when taken from the machine. Temperature readings were taken four times a day, at 7 a.m., noon, 4 p.m., and 8 p.m. The machine was regulated to cut out at 101 degrees and cut in again at 100 degrees. This was found to be the temperature which gave the best results. Very little temperature trouble was experienced throughout the season. The machine usually rose a ½ degree after the cutting-out time before it commenced to drop back in the temperature again. The temperature was maintained the same in the hatching compartment as in the egg chambers. With the hatching compartment the machine was so designed that the same number of eggs were in that compartment as were in the egg compartment. Eggs were just transferred from one tray to the other. Very little difference was noticed in the hatching in any particular part of the machine.



End view, showing position of switches for each compartment.

Humidity.

Humidity is undoubtedly the factor which influences, probably more than any other factor, the successful hatching in electric incubators. It is extraordinary that, in a number of machines, good hatches are impossible if makers' instructions are closely followed out, and I am very definitely of the opinion that local conditions are the all-important factor with regard to the control of humidity in incubation, especially with the all-electric types of machines where such large numbers of eggs are incubated in so small an area. I would point out that in the construction of these machines the hatching compartment in each machine was built larger than the egg compartment in order that a bigger circulation of air could be obtained, for with the full loading in these machines as many as 3,000 to 3,500 chickens were frequently hatched in one hatching. Realising the greater importance of humidity in this type of incubator, humidity indicators were installed in each section as a guide, or what was thought to be a reliable indication, of the requirements of the humidity in this type of machine. Experience, however, has shown that, after very close attention to the humidity readings, it is inadvisable to follow these indicators very rigidly. As a matter of fact, after running the machines for three to four weeks, the indicators were discarded, and the basis taken for humidity was on the size of the air-cell in the eggs on the 7th and 18th day. This, to my mind, is the only safe guide in this type of incubator, irrespective of whether humidity indicators are used or not. Frequently, in order to keep the humidity at the degrees advised for successful incubation, it was necessary to have, at times, the ventilators wide open, with a consequent over-drying of the eggs, in order to hold the correct humidity, and on several occasions it was necessary to keep the machines practically closed up to maintain the correct humidity readings, with the result that the eggs were not drying out sufficiently. The size of the air-cell should be the dominating factor in regard to the correct humidity and airing of the machines in all incubation, whether of the still-air type of machine or the all-electric machines. The size of air-cell is obtained by increased ventilation in the machines, and I believe that this is a phase on which a large number of incubator users are a little afraid, especially with incubators of a capacity of 10,000 eggs upwards. The opening of the doors two or three times a day, if only for a minute or two should be practised. On page 429 will be found diagrams of eggs showing the size of air-cell aimed at in this series of incubation, and I would particularly emphasise the necessity of getting the approximate size of the air-cell as shown in the diagram at the time the eggs are transferred to the hatching compartment, that is, the 18th day. This question should be very closely studied from the 14th to the 18th day. If the air-cell is not large enough extra drying out should be provided for. This, of course, is done by close attention being given to the ventilators.

Hatching Compartments.

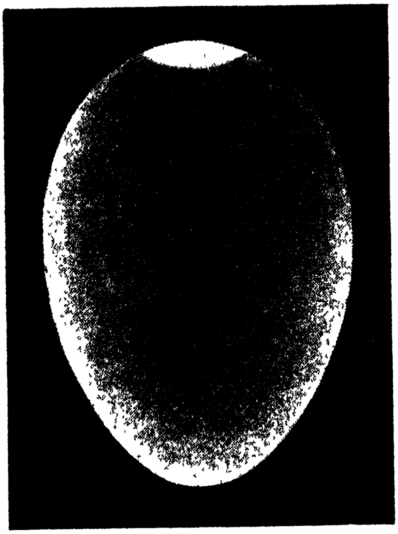
The hatching compartment in this type of machine is of the greatest importance. It will be seen that, in the machines where this work was being done, a separate hatching compartment was built. This allows for complete disinfecting and cleaning of the hatching compartment after each hatching. I realise, however, that successful hatches are obtained by some makes of machines where the hatching compartment is not separate. The practice in these machines was that, after each hatching was completed, the racks were wheeled out of the machine, which left sufficient room for a man to get inside, thoroughly cleanse the machine in every part of this compartment, and disinfect it. The current was switched on again and the door left open for the night, so that the effects of the disinfecting and cleaning were blown out of the machine during the night. This ensured that every batch of eggs that went into the hatching compartment was placed in a clean and sweet atmosphere.

The circulation of air in this machine was so arranged that, in the hatching compartment, for the convenience of cleaning, the propellor or fan was taken off just by unscrewing a stud to allow the operator to work with perfect safety in that compartment.

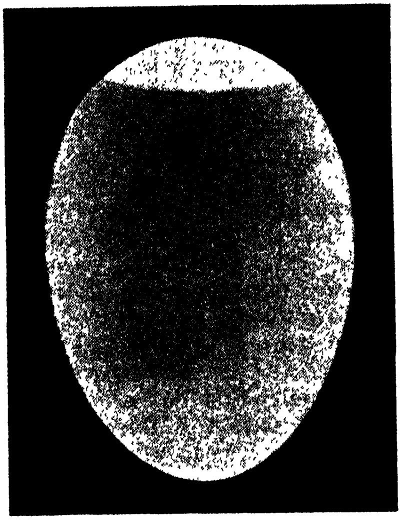
Moisture in the Hatching Compartment.

With this large volume of eggs in one compartment moisture, of course, is very important. The method of applying

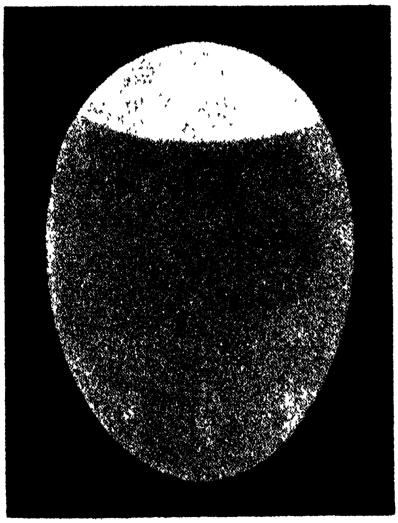
Illustrations Showing Size of Air-cell at Various Stages of Incubation.



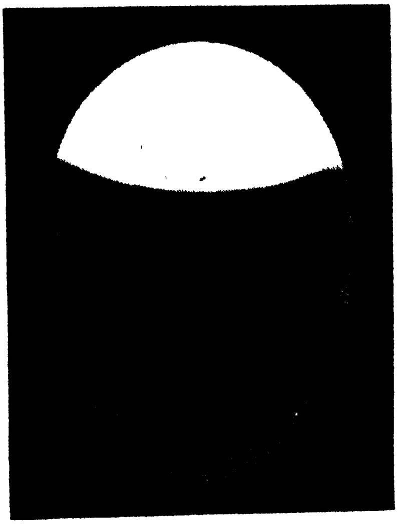
No. 1. Standard egg, showing normal air-cell when laid.



No. 2. Size of air-cell on 7th day of incubation.



No. 3. Size of air-cell on 14th day of incubation.

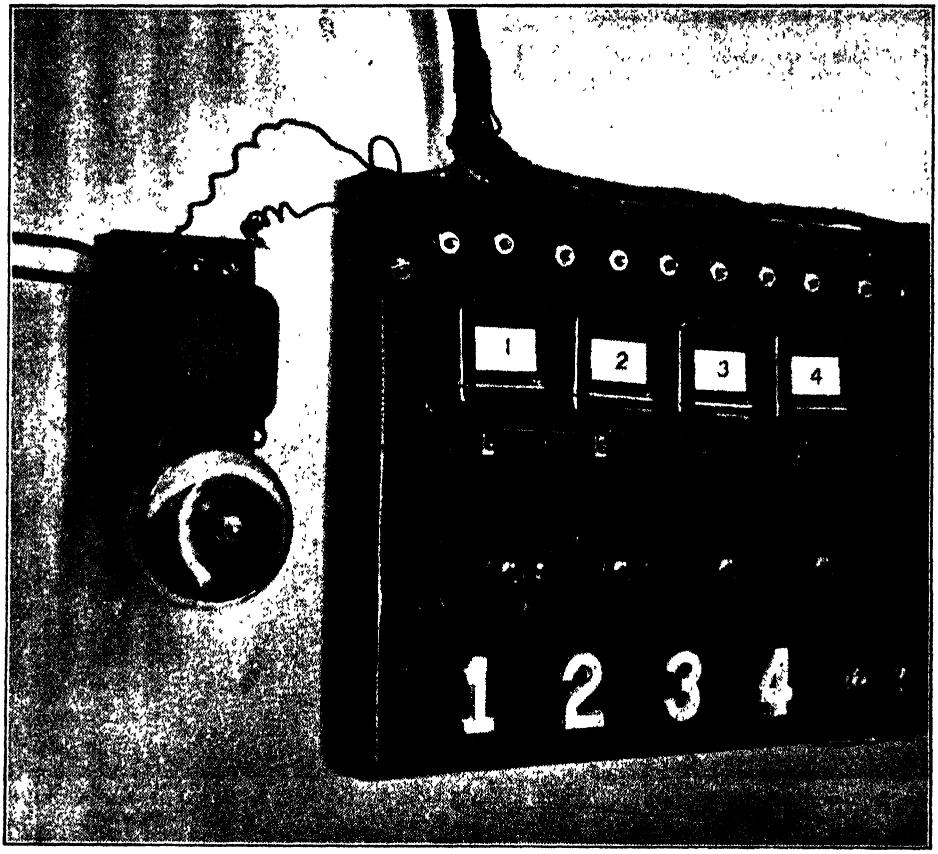


No. 4. Size of air-cell on 18th day of incubation.

moisture in these particular machines was by moisture pans and a tank on top of the machine with a drip tap; the water dripped on to the propellor and thus circulated through the compartment. The heat was switched on in the hatching compartment one hour before the eggs were transferred from the egg compartment. The eggs were transferred to the hatching compartment, between 3 p.m. and 4 p.m., 18 days after being set. When the eggs were transferred two moisture trays were placed on the bottom of the machine. On the 19th day two more moisture trays were placed on top of the egg rack and two midway in the rack. The drip tap was turned on, on the 19th day, at the rate of 20 to 30 drops a minute. On the twenty-first day all moisture trays were taken out at midday, the drip tap turned off and ventilators opened. This method ensured all chicks being thoroughly dried off by 7 a.m. on the 22nd day, when they were unloaded from the machine.

Testing.

For the purpose of checking the fertility of the eggs supplied by each settler a code was arranged, and each settler had a number. If the fertility was not up to the average, or any defect was noticed in the eggs, an investigation was immediately made on the farm of that particular settler, and the defect corrected. This system undoubtedly saved many thousands of eggs during the season, and also acted as a reliable guide to the suitability or otherwise of the methods adopted by the various settlers. The practice throughout the season was for the eggs to arrive at the hatching centre at least 24 hours before they were placed in the machines. Immediately



Alarm Indicator Board. If the temperature was either too low or too high, the indicator for the particular section dropped. This obviated the necessity of looking at all sections to discover the fault.

Sexers at work; 55,500 chickens were sexed during the season.

on arrival they were taken from the cases, the weight checked up—no egg under 2ozs. in weight was set—placed on the egg trays, and put in a rack prior to placing in the machine. At the end of the 7th day the first testing was made for fertility, and again on the 18th day another test was made and any dead germs and partly-developed germs were rejected before the eggs were placed in the hatching chamber. I consider that, not only for successful hatching but in the interests of commonsense incubation, two tests are necessary, and I do not hold with the view of testing eggs only on the 18th day, for with several infertiles, together with dead germs, the smell given off by these eggs is almost unbearable, and it is very difficult to see how the best class of chicken can be hatched under these conditions. As a matter of fact, I do not think it is possible to do so.

Comparisons of the Hatching of the Two Machines.

These machines were housed in a room 30ft. long, 17ft. wide, and 11ft. high, with a cement floor and 6 "hit and miss" ventilators in the ceiling. The walls were insulated on each quarter. On the eastern side there was a window 6ft. wide by 6ft. high opening inwardly and also a 3ft. door. On the western side there was an 8ft. door, and also a window 5ft. by 6ft. opening inwardly. This provided ample ventilation for the room, and sufficient ventilation could be used, irrespective of the direction of the prevailing winds.

Where large numbers of chicks are being hatched in small areas it is essential that there should be provision for ample ventilation in the room. So clean was the atmosphere one could at any time, possibly with the exception of the hatching period, enter this room and, unless he was told, not know that there were incubators at work.

The machines, so far as was humanly possible, were constructed exactly the same, that is, heating, ventilation, size of compartments, size of egg trays, &c., were identical, yet right through the whole season the Thursday machine gave the better results, and was hatching after the eggs were transferred to the hatching chamber 4 per cent. more chicks than did the Monday machine. There is no explanation for this, as the eggs were all coming from the same sources throughout the whole season. The treatment in regard to temperature, testing, handling, &c., was exactly the same for each machine and, as far as could be seen, there was no reason because of the housing of the incubators for this difference.

From the tables it will be learnt that in the Monday machine for the whole season 37,757 eggs were set, 27,614 eggs transferred to the hatching compartment on the 18th day, and 22,769 chicks were hatched. The percentages are 60.3 per cent. chicks hatched from eggs set, and 82.4 per cent. of chicks hatched from eggs transferred to the hatching chamber. Thursday machine: Number of eggs set for the season, 49,436; number of eggs transferred to hatching chamber, 38,006; number of chickens hatched, 32,732; percentage of chickens hatched from eggs set, 66.2 per cent.; percentage of chickens hatched from eggs transferred, 86.1 per cent.; or a total for the season for the two machines of 87,193 eggs set, 65,620 eggs transferred to the hatching chamber, and 55,501 chickens hatched.

TABLE NO. 2.—*Monthly Summary of Fertility in Eggs.*

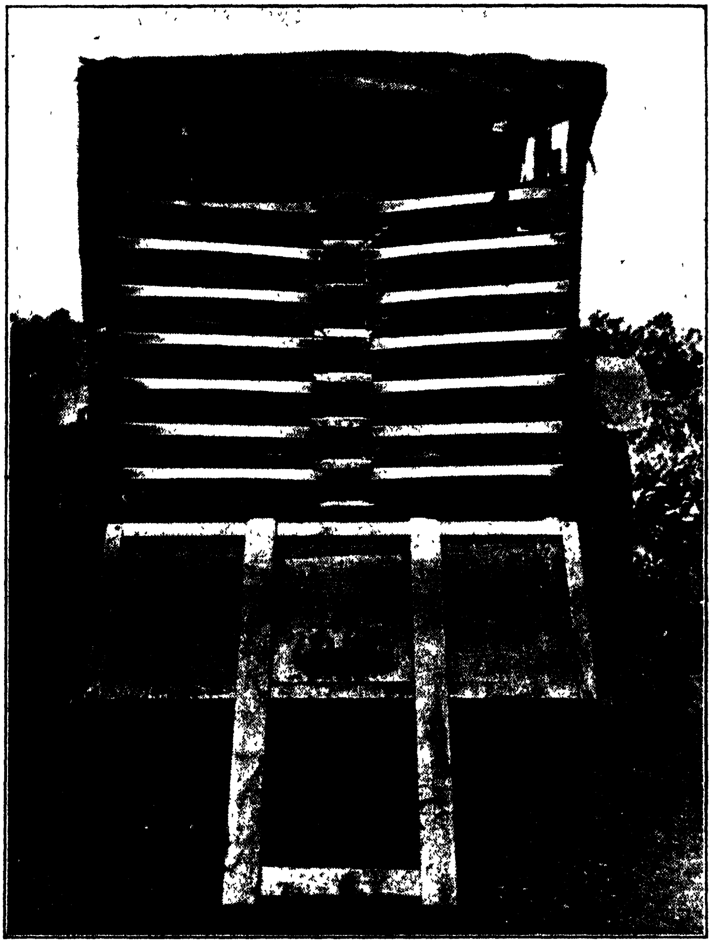
Month.	No. Eggs Set.	No. Eggs taken out First Test.	Percentage Infertile Eggs First Test.	No. Eggs Left in after First Test.	No. Eggs taken out Second Test.	Percentage Dead Germs Second Test.
Monday Machine—						
July	8,413	1,709	20·3	6,704	677	10·09
August	16,041	2,172	13·5	13,869	1,918	13·8
September	13,303	1,767	13·2	11,536	1,900	16·4
Total	37,757	5,648	14·9	32,109	4,495	13·9
Thursday Machine—						
July	13,940	2,159	15·4	11,781	1,037	8·8
August	15,109	1,991	13·1	13,118	1,303	9·9
September	20,387	2,501	12·2	17,886	2,439	13·6
Total	49,436	6,651	13·4	42,785	4,779	11·1

A Summary of the Fertility of Eggs Tested on the First Test, also on the Second Test Throughout the Season.—In order to see the influence of the particular setting months on fertility, dead germs, &c., the foregoing tables are appended.

The tables show the difference in fertility on both the first and second test percentages for the three setting months—July, August, and September. It will be seen that for the Monday machine, from a total of 37,757 eggs set, 5,648 eggs or 14.9 per cent. were tested out on the first test, and a further 4,495 taken out on the secend test, which equals 13.9 per cent. On the Thursday machine, out of a total of 49,436 eggs set for the season 6,651 were tested out on the first test, which equals 13.4 per cent., and 4,779 on the second test which equals 11.1 per cent. Further, on the first test, that is, the July setting, the fertility was the worst in each case, while for August and September settings the infertility was practically the same. Again, in reference to the machines, the Thursday machine shows again a little better both on the first and the second test than the Monday machine. The agregate testings for the two machines were:—Number of eggs set, 87,193; number tested out on the first test, 12,299; number tested out on the second test, 9,274; number transferred to the hatching compartment, 65,620.

Supply and Transport of Chickens from the Hatching Centre.

As previously mentioned, chickens were supplied on each Tuesday and Friday during the season. Machines were opened at 7 a.m., chickens removed from the incubators, placed in day-old chicken boxes, and transferred to the sexing room. After the chickens were sexed they were packed in cardboard chicken boxes, each holding 80 chicks, and each box being divided into 4 compartments of 20 chicks to a compartment. The question of transport was one of great importance. Any delay, especially to districts where wet and cold weather is experienced throughout the hatching period, would probably have resulted in serious losses. Some special means of transport, therefore, had to be arranged. A trailer was purchased, and special racks built into the trailer so that the chickens had ample ventilation, irrespective of the class of weather, and also that the boxes did not bump about too much. The chickens were taken from the sexing room, placed in the trailer, and delivered direct to the respective settlers. Generally, the trailer left the hatching centre at approximately mid-day, and reached the first settler somewhere about 2.30 and 3 p.m. Final delivery would be given between 4 p.m. and 5 p.m. This system worked admirably, and practically no losses were ex-



View of trailer, illustrating method of packing chickens for transport. Provision for transporting 3,600 chickens a trip was provided in the trailer.

perienced in transport throughout the whole season. Each settler was supplied with 3 batches of chicks at intervals of from 3 to 4 weeks between each batch. The same set of boxes were used throughout the season, and are still in a suitable condition for much more use. The costs, therefore, is kept to the very minimum.

Sexing.

It was decided to have all chickens sexed. The object of this being that all the chickens hatched were White Leghorns, and, of course, the cockerels, in a State like South Australia, would probably have resulted in a loss if they were reared for market purposes. In addition, there was the very important factor of keeping the capital costs of the settler to the lowest. Therefore, by having the chicks sexed, the brooder accommodation was reduced by 50 per cent., and also the feeding cost. In other words, if the chickens were not sexed just twice the number of chickens would have been necessary for each settler. This would have necessitated doubling the brooder accommodation. It must be kept in mind that, for successful commercial hatching, there are in South Australia only three months or a trifle longer during which hatching can be done, and assuming that the chicks are kept in the hot brooder for from 3 to 4 weeks only 3 runs of the brooders can be made during the season.

(Continued on next page.)

Dipping Bath for Horses

Owing to a number of inquiries having been received by the Stock and Brands Department, Adelaide, for a plan of a dipping bath for horses, the Department has had prepared by the Architect-in-Chief's Department, Adelaide, a plan with specifications. A dip of the specification set out in the plan opposite would be suitable for communal dipping purposes. It may be modified as desired for use on individual farms.

The object of the bath is for the treatment of leg itch in horses, which is very prevalent in this State.

It will be noted that the bath is 20ft. long with sloping approaches, and two horses can be kept in the dipping solution at one time. The depth of the bath is 4ft., but it need only be filled with the dipping mixture sufficiently to cover the legs to about 4in. above the knees and hocks, as while animals are standing in the solution, the manes and tails can be swabbed by applying the solution with a body brush attached to a long handle. The horses are left in this solution just sufficiently long to ensure thorough saturation of the legs, and it is advisable to repeat the treatment three of four times with an interval of seven days between each treatment.

A coal tar disinfectant solution is recommended for use in the bath. A number of such proprietary preparations are obtainable, and the directions as to strength for mixing as set out by the manufacturer should be followed. Where these are not specified, use the solution at 1 per cent. strength (1gall. to 99galls. of water, and use soft water for preference, if available).

Modern Methods of Incubation.

(Continued from previous page.)

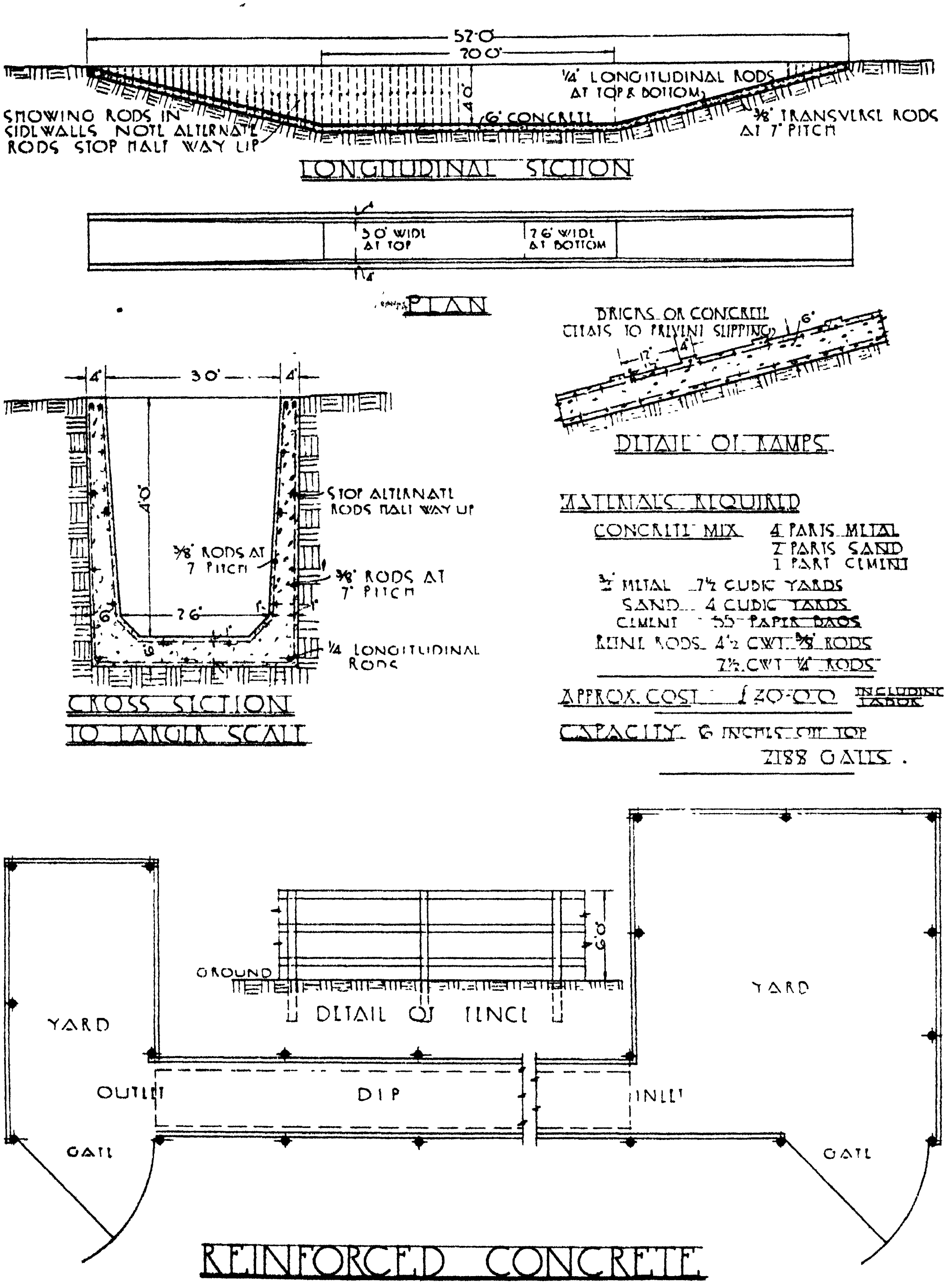
Sufficient chicks have been sexed during the season, that is, 55,501, to give a fairly accurate guide to any serious effects or otherwise upon the chicken due to the handling necessitated while sexing. The chickens were sexed immediately after taken from the incubators, that is, the machines were opened at approximately 7 a.m., sexing was started as soon as the chickens were boxed, and generally the chickens were re-boxed, packed in the trailer, and on their way to the settlers by mid-day. Three sexers were employed on each Tuesday and Friday, and they were sexing approximately 800 chickens each. It can be said that there was no noticeable damage or ill-effects to the chickens which could be attributed to the sexing. Additional interesting information will be obtained in a further article to appear in this *Journal* on the subject of the rearing of these chickens, together with rearing equipment, &c., where it will be seen that the rearing results have been very satisfactory, and no ill effects due to sexing have occurred to the chicks. It is interesting to note that during the season 55,501 chickens were sexed, 26,227 were classed as cockerels, and 29,274 as pullets. It is also interesting to refer to the following table concerning sexing:—

TABLE NO. 3.—*Monthly Percentages of Sexing.*

	Total Sexed.	No. Chicks.	No Pullets	Percentage Pullets.
July	3,922	1,799	2,123	54·1
August	13,501	5,999	7,502	55·5
September ..	20,746	9,861	10,885	52·4
October	17,332	8,568	8,764	50·5
	55,501	26,227	29,274	—

In the above table the number of chickens sexed each month, together with those classed as cockerels and pullets, are shown. For the 4 months, July showed 54.1 per cent. pullets, August 55.5 per cent., September 52.4 per cent., and October 50.5 per cent.

The results for the season can be considered satisfactory. In many instances during the season hatches of 95 to 96 per cent. of eggs transferred to the hatching compartments were obtained, while on two occasions 100 per cent. of eggs transferred were hatched. Interesting features were:—(1) That barley as a food fed to poultry as a mash and as whole grain has given good results. (2) That 63.6 per cent. of all eggs set were hatched. (3) That 84.5 per cent. of eggs transferred to the hatching compartments were hatched. (4) That the September settings gave the best hatching results.



MATERIALS REQUIRED

CONCRETE MIX 4 PARTS METAL
2 PARTS SAND
1 PART CEMENT

3/4" METAL 7½ CUBIC YARDS
SAND 4 CUBIC YARDS
CEMENT 55 PAPER BAGS
REINF. RODS 4½ CWT. 3/8" RODS
2½ CWT 1/4" RODS

APPROX. COST £20-0-0 INCLUDING LABOUR

CAPACITY 6 INCHES OFF TOP
2188 GALLS.

REINFORCED CONCRETE HORSE DIP

Reworking Fruit Trees

PART III.—BUDDING.

[By H. H. ORCHARD, Horticultural Adviser.]

(Continued from page 128, *September issue.)*

This is the concluding article in a series describing methods employed in changing the variety of fruit trees. Parts I. and II. appeared in the July and September issues respectively. The complete series will shortly be published as a Bulletin.

Budding is a method of propagating varieties of fruit trees which is used extensively by nurseryman, and is now frequently used wholly or in conjunction with other grafting methods (described in previous articles) for reworking full bearing apple and pear trees.

The operation may be performed during spring, summer and autumn, but autumn budding is most favoured by nurserymen. The young seedling stock is then large enough and sufficiently matured to take buds, and experience has proved that better trees result than when raised from summer buds. The autumn bud inserted in February or March lies dormant throughout the winter, breaking into growth with the first movement of sap in the spring.

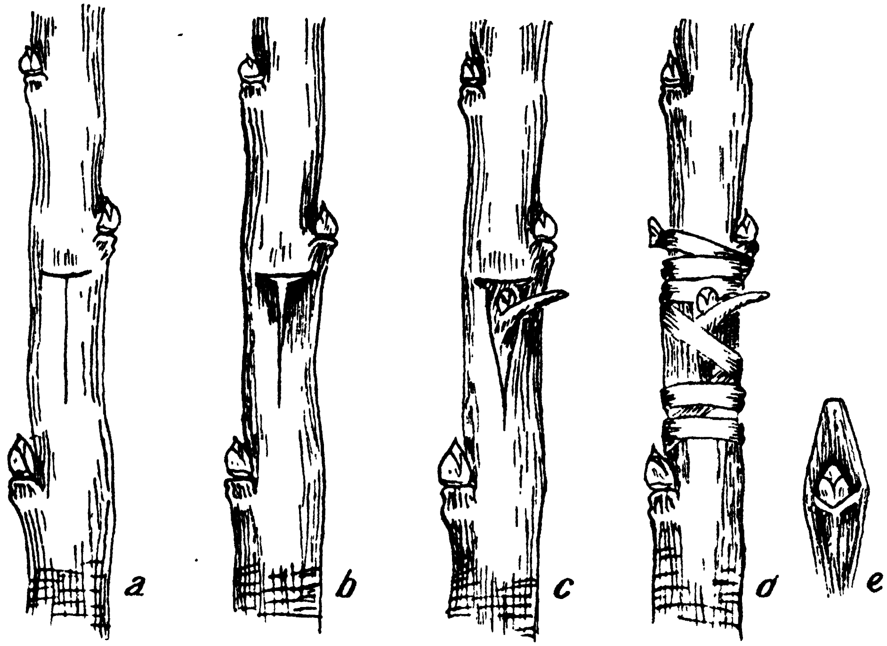
Selection of Scion Material.

The selection of well-developed buds is essential. They should come from medium-sized shoots, in preference to strong-growing shoots, taken from proved healthy and fruitful trees. Buds taken from the centre of the shoot or bud stick can generally be relied upon to be well developed and suitable for the purpose.

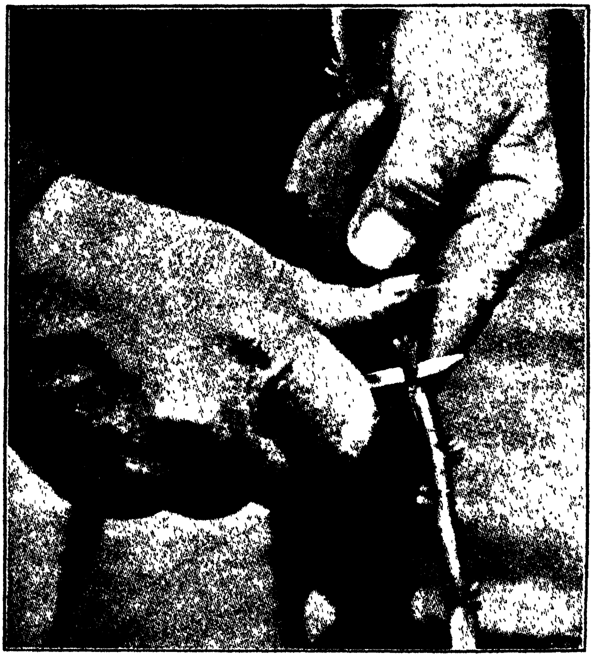
The bud stick once severed from the tree should, without delay, have the leaves removed, leaving only a short piece of stalk attached to each bud. This portion of stalk acts as a handle when inserting the bud under the bark, and is also a useful guide as to whether the buds have been successful. Should the stalk come away readily from the bud some 10 to 12 days after insertion it is usually an indication that the operation has been successful, whereas in the unsuccessful effort, the stalk shrivels, and is not readily detached.

A two-year-old budded Cleopatra shoot carrying 28 apples in Mr. W. Goldsack's orchard, Coromandel Valley. Cleopatra was budded on to Chenango Strawberry, worked on to Northern Spy stock. The tree was estimated to carry 3bush. of apples.

The bud sticks should be wrapped in damp bagging during hot weather, but not put in water, which latter practice tends to soften the bark and injure the buds. The practice of preparing a number of buds beforehand and placing them in a tin of water until such time as they are required is definitely injurious. Buds should only be removed from the bud sticks as required, and then the sooner they are inserted and

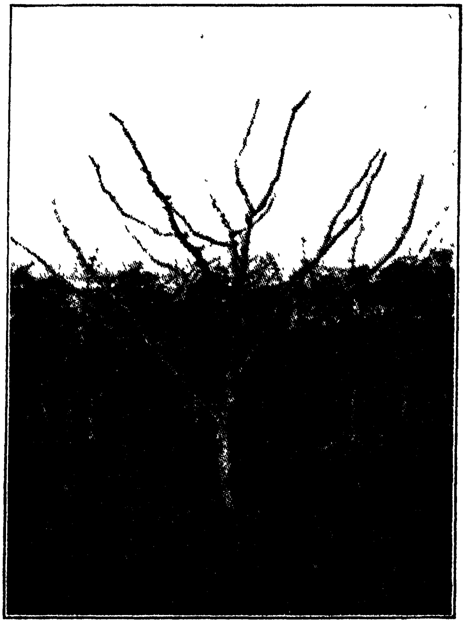


(*a*) T-shaped cut in the stock (*b*) The bark raised ready to receive the bud. (*c*) The bud inserted for tying. (*d*) The job completed (*e*) A well developed bud.
[From Vic. Dept of Agric Bltn. No. 63.



The bud ready for insertion

How to hold the bud stick and cut out the bud.
[Both from N.S.W. Farmers' Bltn. No. 63.



Reworking old trees by budding. An apple tree stripped of all small laterals and fruit spurs during dormant period.

[From Tasmanian Dept. Agric. Bulletin No. 3.

wrapped the better. Raffia is suitable for wrapping, and the buds are inserted on the current year's growth.

Two cuts, making a letter T about 1¼in. in length, are made through the bark of the stock with a sharp budding knife, and the bud gently pressed down under the bark and kept there securely by tying with raffia. To permit of ready loosening in 10 to 12 days as the bud swells, the raffia should be tied in a bow.

Preparation of Buds.

To remove the bud from the bud stick the latter is held in the left hand with the forefinger directly underneath the bud to be severed. Half an inch below the bud a cut is made through the bark into the wood, and continued up under the bud without cutting deeply, eventually emerging ½in. above the bud. The thin shaving of wood which adheres to the severed bud should be removed from the buds of apricot, cherry, and peach, but may remain in the case of apple, pear, plum, and citrus buds. Great care is necessary when removing the wood from the back of the bud. Should the pinpoint running to the eye of the bud be removed at the same time the bud will not "take." The severed bud must be inserted without delay.

Framework Budding for Reworking of Unprofitable Varieties of Fruit Trees.

In the winter all lateral growth is removed, and the tree thus severely pruned will normally produce many young shoots from dormant buds in the spring. Early in the growing season these young shoots are thinned out to one shoot for every 8in. to 12in. of framework branch, and as far as possible are left on alternate lateral sides of the limbs. Provided the tree is in a healthy condition the shoots will be suffi-

Cleopatra budded on to a Northern Spy tree 12 months previously, and carrying 70 apples. There was 100 per cent. take of buds.

ciently large by February to receive buds of the more profitable variety. One bud is inserted in the base of each young shoot as closely as possible to the main branch, the buds tied with raffia, and apart from loosening of ties no other attention is necessary until the dormant period, when each shoot should be cut away immediately above the inserted bud during August.

Framework budding is economical in that only one bud is required for each new lateral, a matter of importance where scion wood is limited. The vigorous growth arising from a single bud usually requires summer pruning to encourage and hasten branching or the establishment of lateral growth; instances are known where fruit (apples) were borne one year from the insertion of the bud.

Frequently growers resort to autumn budding to fill spaces along the framework limbs when reworking by means of spring grafting has been followed by failure of some scions to take and the bursting of new growth nearby.

(*Concluded.*)

Feeding Tests at Parafield Poultry Station

[By C. F. Anderson, Chief Poultry Adviser.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April, 1935, to 30th November, 1936.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal, 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

5. *Mash*, during autumn and winter.—Crushed barley, crushed wheat, chaffed greenfeed and meatmeal. During spring and summer the mash is varied, bran being substituted for the crushed barley.

Grain.—2ozs. wheat per day.

	No. Eggs Laid 1st April, 1935, to 31st October, 1936.	No. Eggs Laid Month of November, 1936.	Total Eggs Laid 1st April, 1935, to 30th November, 1936.
No. 1 Test	10,775	626	11,401
No. 2 Test	10,758	682	11,440
No. 3 Test	11,666	705	12,371
No. 4 Test	9,362	584	9,946
No. 5 Test	9,936	654	10,590

Egg-Laying Competitions

Official Single Test conducted at Parafield

Review of the Competition for the month of November, 1936, by C. F. Anderson (Chief Poultry Adviser) and A. Clifton (Competition Attendant).

Weather for the month of November has been very mild, with the exception of two days—27th and 29th. Production has kept up well for this period of the year, although towards the end of the month, especially the last week, there was a falling off in the laying. It is noticeable, however, that the birds which have been the best producers throughout the test still continue to lay well even through the warmer months. The drop in average production is not due to the easing off of the good birds, but to the drop in the average of the poorer producing birds, which were never laying as well as the leading groups.

A few warm days were experienced during the first week of the month, when the birds did not eat as much as during the cooler months; a slight reduction in the amount of bran, pollard, and wholemeal fed in the morning mash was made.

On the 27th and again on the 30th the temperature was over 100 degrees, but although several birds felt the heat on the second day, there were no deaths; although the temperature was around 104 degrees, there was a hot wind blowing throughout the day; it is always noticed that if there is any movement of wind—even though it is hot—the heat is not felt so much by poultry as when the atmosphere is perfectly still.

White Leghorn No. 315, owned by Mr. C. A. Maxwell, maintains first place in her class, and bird No. 346, owned by Mr. J. G. Slee, has gained two eggs on the leading bird for the month, laying a total of 25 first-grade eggs for the 30 days. Two outstanding scores in Section I. were those of birds Nos. 67 and 301, each laying a total of 29 eggs in 30 days. Bird No. 67 laid a sequence of 27 eggs in 27 days; unfortunately, however, a number of these eggs were below the minimum weight standard.

In the section for Black Orpingtons, bird No. 381, entered by the Willow Bend Stud Poultry Farm, still holds pride of place, having laid 25 first-grade eggs for the month. This is a good score for heavy breeds, especially at this time of the year and in a hot climate such as that at Parafield.

Broodiness has been evident among many of the heavy breeds, although in some of the entries this has not been the case—one instance being the Willow Bend Stud Poultry Farm with the leading team of Black Orpingtons. Rhode Island Red No. 38, owned by Mr. A. G. Dawes, lost the first place in November through being broody for 10 days after laying a sequence of 16 first-grade eggs in 16 days.

A team which laid particularly well was the Orpington team owned by Mr. H. J. Mills, which laid 113 first-grade eggs for the month.

The average daily production for the month of November was 307 eggs—201 first-grade eggs, and 106 below first grade.

There were three deaths recorded during November, bringing the total up to 20 since the commencement of the test.

LEADING SCORES TO 1st DECEMBER, 1936.—FIRST GRADE EGGS ONLY.

SECTION I.—WET MASH.

Class 1.—White Leghorns—351 birds competing.

Singles—	Eggs Laid.	Birds Nos.
C. A. Maxwell	185	315
J. G. Slee	181	346
S. Lambert	178	194

Class 1—*continued.*

	Eggs Laid.	Birds Nos.
Trios—		
A. O. Dawkins	491	85–87
Willow Bend Stud Poultry Farm	479	295–297
W. H. L. Norman	476	307–309
Teams—		
A. Young	888	7–12
J. C. Normandale	880	235–240
A. O. Dawkins	879	85–90
W. M. Field	876	139–144

Class 2.—Any other Light Breed (Minorcas)—15 birds competing.

Singles—		
R. M. Yelland	137	371
V. F. Gameau	137	366
R. M. Yelland	133	372
Trios—		
Langmaid and Bettison	312	358–360
R. M. Yelland	276	370–372
V. F. Gameau	240	364–366
Teams—		
Langmaid and Bettison	505	358–363
V. F. Gameau	371	364–369

Class 3—Black Orpingtons—15 birds competing

Singles—		
Willow Bend Stud Poultry Farm	177	381
A. G. Dawes	170	377
Willow Bend Stud Poultry Farm	168	384
Trios—		
Willow Bend Stud Poultry Farm	484	379–381
H. H. Gallagher	436	397–399
Willow Bend Stud Poultry Farm	425	382–384
Teams—		
Willow Bend Stud Poultry Farm	909	379–384
H. J. Mills	790	385–390
A. G. Dawes	730	373–378

Class 4.—Any other Heavy Breed—36 birds competing.

Singles—		
Willow Bend Stud Poultry Farm (Rhode Island Reds)	171	424
A. G. Dawes (Rhode Island Reds)	163	38
A. G. Dawes (Rhode Island Reds)	161	419
Trios—		
K. Pennack (Barnevelders)	**392**	**439–441**
K. Pennack (Barnevelders)	**380**	**436–438**
V. F. Gameau (Rhode Island Reds)	**369**	**433–435**

Class 5—*continued.*

	Eggs Laid.	Birds Nos.
Teams—		
K. Pennack (Barnevelders)	772	436–441
V. F. Gameau (Rhode Island Reds)	613	430–435
A. G. Dawes (Rhode Island Reds)	567	37–42

SECTION II.—DRY MASH.

Class 5.—White Leghorns—15 birds competing.

Singles—		
A. O. Dawkins	188	449
A. O. Dawkins	179	452
A. O. Dawkins	169	453
Trios—		
A. O. Dawkins	488	451–453
A. O Dawkins	467	448–450
Willow Bend Stud Poultry Farm	352	454–456
Teams—		
A. O. Dawkins	955	448–453
Willow Bend Stud Poultry Farm	593	454–459

Class 7.—Black Orpingtons—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	163	468
Willow Bend Stud Poultry Farm	147	466
Trios—		
Willow Bend Stud Poultry Farm	400	466–468

Class 8.—Rhode Island Reds—6 birds competing

Singles—		
Willow Bend Stud Poultry Farm	125	470
Willow Bend Stud Poultry Farm	123	471
Trios—		
Willow Bend Stud Poultry Farm	343	469–471
Willow Bend Stud Poultry Farm	257	472–474
Teams—		
Willow Bend Stud Poultry Farm	600	469–474

SECTION III.—WET MASH.

Class 9.—Any Breed—27 birds competing.
(Home Project Utility Section.)

Name. School. Breed.		
Anthony Rix, Williamstown, White Leghorn	173	478
David Hart, Unley High, Black Orpington	165	495
Warren Hannaford, Paracombe, White Leghorn	163	486
Keith Oliver, McLaren Vale, Black Orpington	162	498
Malcolm Booth, Bridgewater, Black Orpington	161	497

Results of Wheat Crop Competitions, 1935-6

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total
		Maxima—	35	25	20	15	5	100
	WAY.							
	Judged by W. H. Brownrigg, District Agricultural Adviser.							
1	Messrs. Gaden & Linke, Koonibba.	Early Gluyas	28	20	14	13½	4	79½
2	L. Martin, Maltee	Quality	22	20	17½	14	4	77½
3	W. H. Watson, Mudamuckla	Nabawa and Ford	22½	18	18½	13½	4	76½
4	R. Lovelock, Smoky Bay	Canberra	24	19	14	13	3½	73½
5	P. S. Morrison, Waranda	Felix	15	22	18	14	4	73
	Messrs. Gaden & Linke, Koonibba.	Ford	18	21	18	13	3	73
7	C. H. Collins, Ceduna	Quality	17	19	17	13	3	69
8	A. E. Howlett, Goode	Ford	14	19	18	14	3	68
	T. Hellier, Mudamuckla	Ford	17	19	16	13	3	68
	J. Reinke, Mudamuckla	Wagga	17	18	17	13	3	68
11	E. Pfeiffer, O'Loughlin	Canberra	13	20	17	13	3	66
	W. L. Edson, Ceduna	Ranee 4H and Sword	16	17½	15½	13	4	66
	BALAKLAVA.							
	Judged by F. C. Gross, Field Officer.							
1	A. N. and H. Freebairn, Owen	Ford and Sword	32	24	18	14½	3½	92
2	Sorrell Bros., Barabba	Ford and Sword	29	24	19½	13½	4	90
3	Bowyer Bros., Owen	Sword	28	23	19	14	4	88
4	A. G. Roberts, Barabba	Sword	26	24	19	14	4	87
5	J. D. Campbell, Barabba	Sword	24	25	20	14	3½	86½
6	G. Uppill, Balaklava	Caird	28	23	18	14	3	86
7	Harkness Bros., Owen	Ford and Sword	24	24	18½	14	4	84½
8	O. J. Wilson, Barabba	Sword	24	24	18	14	4	84
	J. A. Campbell, Stockyard Creek	Ford	23	24	20	14	3	84
10	D. J. Wilson, Stockyard Creek	Nawab	22	24	19	14	4	83
11	I. M. Parker, Woods	Sword	26	22	17	14	3	82
12	A. G. Roberts, Barabba	Sword and Nabawa	22	21	20	14	3½	80½
13	C. L. Marshman, Owen	Sword and Nabawa	25	20	18	14	3	80
	ALBERT.							
	Judged by R. L. Griffiths, District Agricultural Adviser.							
1	J. W. G. Mann, Mindarie	Sword and Dundee	27	23½	19	14½	4	88
2	E. A. Kroehn, Nildottie	Bencubbin, Ranee 4H, Dundee	27	23½	18½	13½	4½	87
3	A. E. Carslake, Kunlara	Ranee 4H	27½	22	18½	14	4	86
4	A. E. Carslake, Kunlara	Faun	25	22½	19	14½	4	85
5	H. Bird, Halidon	Sword	25	22	19	14	4½	84½
	A. G. W. Grant, Sandalwood	Sword	25	23	19	14½	3	84½

Results of Wheat Crop Competitions—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total
		Maxima—	35	25	20	15	5	100

ALFRED.

Judged by R. L. Griffiths, District Agricultural Adviser.

1	Auricht Bros., Taldra	Sword and Ranee 4H	30	24	19	14	4½	91½
2	A. E. Obst, Ingalta..............	Silver Bart .	31	22	19½	14	3½	90
3	Murray Shannon, Taldra	Ranee 4H ..	30	21½	19½	14	4½	89½
4	R. E. Thiele, Loxton	Pusa 4	27½	23	19½	13½	4½	88
	A. A. Marsh, Meribah............	Sword and Ranee 4H	28	22½	19	14½	4	88
6	A. E. Reichstein, Paruna.........	Ranee 4H ..	28	23½	19	13	4	87½
7	J. C. Auricht, Taldra	Nabawa	25	24	19	14½	4½	87
	G. J. Zimmermann, Meribah......	Baringa and Nabawa	27	23	18½	14½	4	87
	Ross Hondow, Paruna	Ranee 4H ..	27½	21½	20	13½	4½	87
	A. C. Webb, Paruna	Sword and Baringa	27½	22	19	14	4½	87
	G. E. Hyde, Paruna	Sword	28	24	16½	14½	4	87
	E. M. Edwards, Paruna	Ranee 4H and Sword	27	22½	18½	14½	4½	87
	W. Paull & Sons, Alawoona	Gallipoli	25½	24	19	14	4½	87
	P. Paull, Alawoona	Ranee 4H ..	25	24	19½	14½	4	87
15	A. E. Obst, Ingalta..............	Nabawa	25	23½	19½	14½	4	86½
	J. S. Crouch, Meribah	Nabawa	26	22	20	14	4½	86½
	A. C. Webb, Paruna	Sword	27½	22	18½	14	4½	86½
18	A. W. Traeger, Loxton	Baringa	27	22	18	14½	4½	86
19	R. E. Thiele, Loxton	Bencubbin ..	25	22	20	14½	3½	85
	D. and H. Kretschmer, Paruna ...	Sword	23	24	19½	14½	4	85
21	G. E. Hyde, Paruna	Nabawa	24	24	18	14½	4	84½
22	N. W. Zimmerman, Meribah	Nabawa and Ranee 4H	24	22½	19	14	4	83½
	T. B. Flint, Alawoona	Ranee 4H ..	25	22½	19	13½	3½	83½
24	J. T. Eckermann, Pata	Ford and Silver Bart	24	23	17½	14	4½	83
	A. G. Petch, Meribah	Ranee 4H and Nabawa	24	21½	18½	14½	4½	83
26	F. Haddrick, Paruna	Late Gluyas	25	22½	16	14½	4½	82½

CENTRAL.

Judged by W. C. Johnston, District Agricultural Adviser.

1	T. Shanahan, Freeling	Daphne	34	21	17	14	4	90
2	A. Sissmann, Roseworthy	Sword	29	20	19½	14½	4	87
3	A. M. Dawkins, Angle Vale	Ford	28	21	19	13½	4	85½
4	E. W. Day, Reeves Plains	Sword	26	23	18	14	4	85
5	J. H. Dawkins, Gawler River	Sword	26	21	18	14	3½	82½
6	W. K. Oliver, Wasleys	Nabawa	24	21	19	14	4	82
7	E. and A. Zwar, Stockwell	Ranee 4H ..	23	21	18½	14½	4	81
8	F. Schulz, Nuriootpa	Ford, Nuggett, and Sword	24	20	17½	13½	4	79
9	H. J. W. Griffiths, Salisbury	Dundee and Bencubbin	20	21½	18	14	4	77½

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

FAR NORTHERN.

Judged by E. L. ORCHARD, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	E. H. Hampel, Terka	Sword	32½	22	20	14	4	92½
2	J. J. Modystach, Wilmington	Ford, Sword, and Dundee	32	21	18½	13	4	88½
3	E. H. Schulz, Terka	Sword and Waratah	30	22	19	13	3	87
4	E. H. Hampel, Terka	Dundee	31	21½	19	12	3	86½
5	J. J. Modystach, Wilmington	O.B.	31½	19	16	13½	3	83
6	W. G. Gregurke, Wepowie	Dundee	25	22	19	13½	3	82½
7	T. F. Orrock, Wepowie	Ranee 4H	24	22	19	14	3	82
	H. G. Kupke, Morchard	Free Gallipoli	24	22	19	14	3	82
8	A. R. Lang, Morchard	Ranee	23	23	19	12	4	81

LE HUNTE.

Judged by W. H. BROWNRIGG, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	P. P. Cook, Mount Dampier	Ford	32	20	19	15	4½	90½
2	B. C. Black, Minnipa	Totagin	32½	20	18	13½	3½	87½
3	J. Christian, Yaninee	Bencubbin	31	19	19	13	4	86
4	A. J. Shepherd, Wudinna	Nabawa and Bencubbin	29	21	18	13½	3½	85
4	P. P. Cook, Mount Dampier	Sword	30	20	17	14	4	85
6	T. L. Nottle, Yaninee	Sword and Ford	27	24	16	13	4	84
7	T. A. Holman, Kyancutta	Early Gluyas	28	20	18	13½	4	83½
8	W. P. Bartley, Wudinna	Sword	31	18	17	13½	3	82½
9	W. M. Heath, Pygery	Sword	31	18	16	13	3	81
10	S. C. Billinghurst, Minnipa	Ford	26	20	17	13½	3½	80
11	S. C. Billinghurst, Minnipa	Ranee 4H Sultan	24	19	17	14½	4	78½
12	W. H. Chartier, Minnipa	Ford and Canberra	26	20	17	11	4	78
13	W. J. McBeath, Wallis Park	Merriden	30	16	15	12½	3½	77
14	A. J. Shepherd, Wudinna	Ford	26	16	16	14	4	76
15	J. Christian, Yaninee	Early Gluyas	30	12	17	12	4	75

A. Broad's crop withdrawn.

BUXTON.

Judged by H. D. ADAMS, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	H. A. Cant, Kimba	Waratah	28	23	18	14	4	87
2	C. G. & G. W. Cant, Kimba	Waratah	26	23½	18½	14	4	86
3	C. R. Clements, Kimba	Waratah	24	24	19	14	4	85
4	B. J. Hudson, Pinkawillinie	Ranee	24	23	18½	13½	4	83
	L. S. & L. Beinke, Kimba	Sword	25	23½	17½	13	4	83
6	A. A. & C. Freeth, Kimba	Nabawa	25	23	17½	13½	3½	82½
7	Glen Beinke, Kimba	Sword	24	23½	17½	13	3½	81½
7	F. T. Freeth, Pinkawillinie	Sword	22	23	19	13½	4	81½
9	Martin Bros., Kimba	Ranee	22	23	19	13	4	81
10	O. C. Eatts, Kimba	Ford 20 acres, Sword 30 acres	19	22	17	13	3½	74½

Results of Wheat Crop Competitions—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total
		Maxima—	35	25	20	15	5	100

MID NORTHERN.

Judged by E. L. Orchard, District Agricultural Adviser.

1	W. P. R. Simon, Halbury	Sword	34	22	19½	14	4	93½
2	J. L. Noonan, Gulnare	Nabawa	34	22	17	14	4	91
3	M. Smart & Son, Gulnare	Bencubbin, Ranee 4H, Dundee	33	23	17	14	3	90
4	M. Smart & Son, Gulnare	Aussie	35	23	17	10	4	89
5	W. P. R. Simon, Halbury	Nabawa	33	20½	18	13	4	88½
6	A. Maitland, Rochester	Nabawa	31	22	18	14	3	88
6	Spencer Bros., Koolunga	Ranee 4H	29	23	19	13	4	88
8	W. D. Grigg, Koolunga	Dundee	30	22	19	14	2½	87½
9	A. Maitland, Rochester	Dundee	30	21	18	13	4	86
	Spencer Bros., Koolunga	Dundee	30	21	19	13	3	86
11	F. J. Pedler, Koolunga	Dundee	25	24	19	14	3	85
12	H. S. & O. S. Freeman, Koolunga	Ranee 4H	27	22	19	13	2½	83½
13	E. D. Whitehorn, Koolunga	Ford and Bencubbin	25	22	19	13	3	82

SOUTHERN.

Judged by R. Hill, District Agricultural Adviser.

1	Geo. Gross, Belvidere	Sword	33	22	19	14	4½	92½
2	Wachtel Bros., Palmer	Ranee	33	23	17½	14	4½	92
	A. R. Strauss, Monarto South	Ranee	35	22	17	14	4	92
4	E. V. Paech, Palmer	Sword	32	22	18½	14½	4	91
5	C. S. E. Paech, Tepko	Sword, Ranee, Benbubbin	29	24	18	14	4½	89½
6	C. Baensch, Tepko	Sword	28	23	20	13½	4½	89
7	Rankine Bros., Strathalbyn	Ranee and Baringa	30	22	17	15	4½	88½
8	P. B. Frahn, Monarto	Dundee	28	23	19	13½	3¾	87¼
9	Mattner Bros. and G. Kennedy, Finnis	Ranee	31	20	18	14	4	87
10	A. R. Paech, Tepko	Ranee and Sword	28	23	17½	13½	4½	86½
	C. H. Whittlesea, Langhorne's Creek	Ranee	27	23	18	14	4½	86½
12	N. W. Borman, Millendilla	Sword and Pine Head	27	22	19	14	4	86
	H. A. Hein, Pallamana	Sword, Dundee, Ranee	28	23	17	14	4	86
14	Mattner Bros. and G. Kennedy	Sword	30	20	18	13	4¾	85¾
15	G. W. Faehrmann, Palmer	Ranee	26	23½	19	13	4	85½
16	E. E. Liebelt, Monarto South	Sword	23	23	20	14½	4¾	85¼
17	B. R. W. Lindner, Palmer	Ranee	26	23½	18	13	4½	85
	Mattner Bros. and G. Kennedy	Baringa	30	19	18	14	4	85
19	E. T. & L. Jaensch, Hartley	Sword	28	21	18	13½	4	84½
	Mrs. E. Hartmann, Monarto South	Ranee	29	21	17	13½	4	84½
21	A. P. Braendler, Monarto South	Ranee	27	22	17	13	4½	83½
22	A. B. Jaensch, Hartley	Sword, Ranee, Nabawa	26	22	16	14	4	82
	B. A. Zadow, Tepko	Sword and Dundee	26	21	17½	13½	4	82

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	SOUTHERN—continued.							
24	L. H. Wachtel, Palmer	Sword	25	21	18	14	3½	81½
25	Thomas Bros., Monarto South	Sword	24	21	18	14	4	81
26	H. H. Cross, Woodchester	Ford	25	21	17	14	3¾	80¾
27	Mrs. L. S. Jaensch, Hartley	Ranee and Sword	26	20	17	13	3½	79½
	Thomas Bros., Monarto South	Ranee	25	20	17	13	4½	79½
	Thomas Bros., Monarto South	Sword and Nabawa	24	21	17	13½	4	79½
30	P. B. Frahn, Monarto South	Sword	21	21	20	14	3	79
31	J. Hartmann, Monarto South	Dundee and Sword	25	21	16	13½	3	78½
32	C. F. Altmann, Monarto South	Ranee	23	20	17	14½	3¾	78¼
33	H. B. Scheer, Mannum	Nabawa	18	23½	20	13	3½	78
	E. T. & L. Jaensch, Hartley	Bencubbin	22	22	16	14½	3½	78
	C. A. Whittlesea, Langhorne's Creek	Waratah and Sword	21	22	18	13	4	78
36	S. A. Bretag, Mannum	Sword	20	21	19	14	3½	77½
37	C. F. Altmann, Monarto South	Ranee and Sword	21	18	18	14	3½	74½
38	B. R. W. Lindner, Palmer	Dundee, Sword, Nabawa	19	20	19	13	3	74
39	G. W. Faehrmann, Palmer	Nabawa	18	21	18	12	4	73
40	L. M. Eichler, Mannum	Sword and Nabawa	15	18	20	13	3½	69½
41	Hugo Paech, Rockleigh	Sword, Dundee, Bencubbin	15	20	16	14	3	68
	NORTHERN YORKE PENINSULA.							
	Judged by F. C. GROSS, Field Officer, Department of Agriculture.							
1	J. H. Robertson, Arthurton	Ranee 4H	35	24	17	14	4½	94½
2	J. S. Henderson, Maitland	Ford	34	23	19	13	3½	92½
3	G. E. & H. M. Meier, Paskeville	Sword	30	23½	19	14	4½	91
	J. C. Westbrook, Paskeville	Ford	33	21	19	14	4	91
5	C. G. Tribbeck, Maitland	Sword	33	21	19	13	3½	89½
6	J. C. Westbrook, Paskeville	Ford and Dan	29	23	19	14	4	89
7	M. C. Bussenschutt, Paskeville	Sword	27	24	19	14	4½	88½
8	O. D. Jericho, Arthurton	Ford	24	22	19	14	3	87
9	R. S. Bussenschutt, Paskeville	Dundee	25	24	19	13	4	85
10	M. D. Wright, Cunliffe	Ford	26	23	19	13	3½	84½
11	G. E. Rodda, Thrington	Ranee 4H	22	24	20	14	4	84
12	Gardner Bros., Paskeville	Geeralying, Dundee, Ranee 4H	24	23	19	14	3½	83½
13	L. R. Price, Paskeville	Bencubbin	24	22	19	14	4	83
	A. R. Rowe, Arthurton	Sword and Marshall's No. 3	26	24	15	14	4	83
15	W. A. Harris, Thrington	Waratah	20	23	19	14	4	80
16	C. Rodda, Thrington	Dundee and Bencubbin	20	23	18	14	4	79
17	N. J. Cross, Kadina	Dundee and Bencubbin	22	23	14	14	4	77
18	T. Rodda, Thrington	Sword	17	23	18	14	4	76
19	T. A. Stanway, Kadina	Ranee	18	23	18	13	3½	75½
20	K. D. Vidal, Cunliffe	Ranee	20	17	19	13	4	73

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

JERVOIS.

Judged by H. D. ADAMS, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	A. Spriggs, Cleve	Sword	32	24	19	14	4½	93½
2	Dreckow Bros., Cleve	Sword	32	23½	19	13½	4	92
	R. A. Storey, Miltalie	Sword	32	23½	19	13½	4	92
4	H. Rodda, Mangalo	Ranee	31	23	18	14½	4	90½
	E. Stubing, Yadnarie	Ford	33	23½	16½	13½	4	90½
6	D. H. Venning, Miltalie	Sword	32	23½	16½	13½	4	89½
7	H. E. Steinke, Mangalo	Early Gluyas	31	22½	18½	13½	4½	90
8	E. Stubing, Yadnarie	Sword	29	23	18½	13	3½	87
9	A. Spriggs, Cleve	Ford	28	23½	17½	13	4	86
	E. Stubing, Yadnarie	Ranee	27	23½	18½	13½	3½	86
11	W. F. Wake, Rudall	Waratah	26	24	19	13	3½	85½
12	J. C. Sims, Cleve	Ranee	25	23	18	14	4	84
13	W. Jericho, Yadnarie	Nabawa	25	22½	18½	13	4	83
	G. Sims, Cleve	Waratah	25	23	18	13	4	83
15	D. C. McCallum, Rudall	Sword	23	23½	18½	13½	4	82½
	V. J. Deer, Miltalie	Ranee	26	23	17½	13	3	82½
17	H. M. Burton, Rudall	Sword and Gluyas	23	23½	17½	13½	4	81½
	H. F. Brine, Miltalie	Ranee	24	22½	18	13½	3½	81½
	O. O. Kobelt & Sons, Yadnarie	Felix	22	23	19	13½	4	81½
20	G. Sims, Cleve	Sword	22	23½	18	13½	3½	80½
21	F. L. Badman, Miltalie	Ranee	20	23	18	13½	3½	78
	F. Pearce, Rudall	Ford	21	22½	18	13	3½	78

NORTHERN.

Judged by E. L. ORCHARD, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	A. M. Mahood, Wirrabara	Ranee 4H	35	21½	19	13	4½	93
2	Hollitt & Woolford, Wirrabara	Ranee 4H	35	22	19	12	4	92
3	Blieschke Bros., Murraytown	Ranee 4H	33	22	19	13	4	91
4	P. L. Blesing and R. E. Woolford, Bangor	Baringa and Dundee	33½	20½	20	13	3	90
5	Blieschke Bros., Murraytown	Dundee	32½	22	18½	12½	4	89½
6	Smith Bros., Laura	Dundee	32	22	19	12	4	89
7	H. K. Moore, Jamestown	Ranee 4H	30½	22	19	13	4	88½
	W. F. Wurst, Laura	Dundee and Merridin	31	23	18	12½	4	88½
	J. C. Kleinig, Laura	Dundee and Nabawa	31	23	18	13	3½	88½
10	J. W. Prior, Gladstone	Ranee 4H	29	23	19	13	4	88
	M. Holland, Caltowie	Sword and Dundee	28	24	19	14	3	88
12	E. Pech, Laura	Dundee	31	23	18	12	3	87
13	J. E. Lehmann, Caltowie	Bencubbin	30	22	17	14	3	86
14	H. C. Jaenschke, Wirrabara	Dundee	29	22	19	13	2½	85½
15	O. Pech, Laura	Waratah and Sword	31	21	16	13	4	85
16	A. Crossman, Caltowie	Bencubbin	28	23	17	14	2½	84½

Results of Wheat Crop Competitions—continued.

SOUTHERN YORKE PENINSULA.

Judged by F. C. Gross, Field Officer, Department of Agriculture.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
1	H. Polkinghorne, Minlaton	Sword	35	23	19	14	4½	95½
2	H. H. Glazbrook, Minlaton	Sword	34	23	19	14	3½	93½
3	Alderman Bros., Minlaton	Ford and Sword	30	24	19	14	5	92
4	E. H. Giles, Yorketown	Dundee, Baringa, Sword	31	24	19	14	3½	91½
	H. McBurney, Curramulka	Ranee 4H	31	24	19	13½	4	91½
6	H. McBurney, Curramulka	Bobbin	29	24	19	14	5	91
7	R. Page, Minlaton	Ford and Sword	33	22	19	13	3	90
8	H. Lister, Minlaton	Sword	32	19	19	14	4	88
9	L. W. Williams, Minlaton	Sword	25	21	18	14	3	81
10	M. E. Correll, Minlaton	Ford	25	18	19	14	3½	79½

CHANDOS.

Judged by R. L. Griffiths, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	J. T W. Werner, Lameroo	Sword	30	24	19	14	3½	90½
2	C. W. Lehmann, Lameroo	Sword	30	23½	18	14	4	89½
3	W. H. Cabot, Parrakie	Sword	28	23	19½	14½	4	89
	P. Ross, Parrakie	Ranee 4H	30	22	19	14	4	89
5	C. H. E. Hentschke, Lameroo	Sword and Ranee	28	22½	19	13½	4½	87½
	Przibilla Bros., Parrakie	Silver Bart	25	24	19½	14½	4½	87½
7	L. T. Kakoschke, Lameroo	Ghurka	28	22	19	14	4	87
	W. J. Ross, Parrakie	Sword and Ranee 4H	27	22½	19	14	4½	87
9	J. H. and C. H. Spratt, Lameroo	Ranee 4H	26	22½	19	14½	4½	86½
	F. H. Whittlesea, Jabuk	Waratah	29	21	18	14½	4	86½
11	M. C. Millard, Jabuk	Sword and Walker's Wonder	28	23	17	14	4	86
12	J. L. Koch, Lameroo	Sword	24½	23½	19	14	4½	85½
13	Foale & Sons, Parilla	Ranee 4H	25½	22½	18½	14	4	84½
	A. J. Beelitz, Parrakie	Baringa	26½	21	18½	14½	4	84½
15	A. J. A. Koch, Lameroo	Sultan	24½	22	18½	14½	4½	84
16	J. Hutchens, Parilla	Waratah	23	22	19	14½	5	83½
	J. H. and C. H. Spratt, Lameroo	Sword	23	23	18½	14½	4½	83½
18	E. S. Ross, Parrakie	Sword, Baringa, Ranee 4H	25	21	18½	14½	4	83
19	W. C. Fuss, Lameroo	Sword, Ghurka Ranee 4H	24½	22	16½	14	4½	81½
20	G. A. McCormack, Parilla	Waratah	20	22½	19½	14	4½	80½
21	L. J. T. Foale, Parilla	Ranee 4H	21	20	18	14	4½	77½
22	R. C. Kerley, Parilla	Bobin	20	20½	17	13½	4½	75½
	Junior Entries.							
1	L. T. Kakoschke, Lameroo	Ghurka	28	22	19	14	4	87
2	A. K. Barrett, Lameroo	Ranee 4H	24½	22½	19	14	4½	84½
3	A. Hutchens, Parilla	Waratah	23	22	19	14½	5	83½

Seed Wheat from Crop Competitions, 1936-37

In Wheat Crop Competitions conducted in the undermentioned districts the following competitors exhibited crops which, in the opinion of the judge at the time of inspection, should produce grain suitable for seed purposes:—

ALFRED.

Competitor and Address. Varieties.

A. A. Marsh, Meribah—Sword, Ranee 4H.
Auricht Bros., Taldra—Sword, Ranee 4H.
J. C. Auricht, Taldra—Nabawa.
G. J. Zimmermann, Meribah—Baringa, Nabawa.
A. C. Webb, Paruna—Sword, Baringa.
E. M. Edwards, Paruna—Ranee 4H, Sword.
P. Paull, Alawoona—Ranee 4H.
A. E. Obst, Ingalta—Nabawa.
A. W. Traeger, Loxton—Baringa.
R. E. Thiele, Loxton—Bencubbin.
D. & H. Kretschmer, Paruna—Sword.
G. E. Hyde, Paruna—Nabawa.
N. W. Zimmermann, Meribah—Nabawa

CENTRAL.

E. W. Day, Reeves Plains—Sword.

BALAKLAVA.

A. N. & H. Freebairn, Owen—Ford, Sword.
Sorrell Bros., Barabba—Ford, Sword.
Bowyer Bros., Owen—Sword.
A. G. Roberts, Barabba—Sword.
J. D. Campbell, Barabba—Sword.
G. Uppill, Balaklava—Caird.
Harkness Bros., Owen—Ford and Sword.
D. J. Wilson, Barabba—Sword.
J. A. Campbell, Stockyard Creek—Ford.

FAR NORTHERN.

E. H. Hampel, Terka—Sword.
J. J. Modystach, Wilmington—Sword.
W. G. Gregurke, Wepowie—Dundee, Ranee 4H, Felix, Merridin.
E. H. Schulz, Terka—Sword.
T. F. Orrock, Wepowie—Ranee 4H.

ALBERT.

J. W. G. Mann, Mindarie—Sword, Dundee.
E. A. Kroehn, Nildottie—Bencubbin.
A. W. G. Grant, Sandalwood—Sword.

LeHUNTE.

P. P. Cook, Mount Dampier—Ford, Sword.
S. C. Billinghurst, Minnipa—Ranee 4H, Sultan.
A. J. Shepherd, Wudinna—Ford.

WAY.

L. Martin, Maltee—Quality.
P. S. Morrison, Waranda—Felix.
A. E. Howlett, Goode—Ford.

SOUTHERN.

C. Baensch, Tepko—Sword.
A. R. Paech, Tepko—Sword.
B. A. Zadow, Tepko—Dundee.
C. S. E. Paech, Tepko—Bencubbin.
E. A. Paech, Palmer—Sword.
L. H. Wachtel, Palmer—Sword.
B. R. W. Lindner, Palmer—Dundee.
L. M. Eichler, Mannum—Sword.

SOUTHERN—*continued.*

Competitor and Address. Varieties.

N. W. Borman, Millendilla—Pine Head.
S. A. Bretag, Mannum—Sword.
Rankine Bros., Strathalbyn—Ranee, Baringa.
Geo. Cross, Belvidere—Sword.
H. H. Cross, Woodchester—Ford.
Mrs. L. S. Jaensch, Hartley—Ranee.
A. B. Jaensch, Hartley—Nabawa.
C. A. Whittlesea, Langhorne's Creek—Sword.
C. F. Altmann, Monarto South—Ranee, Sword.
Thomas Bros., Monarto South—Sword.
E. E. Liebelt, Monarto South—Sword.
J. Hartmann, Monarto South—Dundee.
P. B. Frahn, Monarto—Dundee, Sword.
H. A. Hein, Pallamana—Sword, Dundee, Ranee.
Hugo Paech, Rockleigh—Bencubbin.

MID-NORTHERN.

W. P. R. Simon, Halbury—Sword.
A. Maitland, Rochester—Nabawa.
F. J. Pedler, Koolunga—Dundee.
H. S. & O. S. Freeman, Koolunga—Currawa.
Spencer Bros., Koolunga—Ranee 4H.
M. Smart & Son, Gulnare—Bencubbin.

BUXTON.

H. A. Cant, Kimba—Waratah.
C. G. & G. W. Cant, Kimba—Waratah.
C. R. Clements, Kimba—Waratah.

NORTHERN YORKE PENINSULA.

J. H. Robertson, Arthurton—Ranee 4H.
J. S. Henderson, Maitland—Ford.
G. E. & H. M. Meier, Paskeville—Sword.
M. C. Bussenchutt, Paskeville—Sword.
O. D. Jericho, Arthurton—Ford.
G. E. Rodda, Thrington—Ranee 4H.
Gardner Bros., Paskeville—Geeralying, Dundee.
L. R. Price, Paskeville—Bencubbin.
W. A. Harris, Thrington—Waratah.
C. Rodda, Thrington—Dundee.
N. J. Cross, Kadina—Dundee.

JERVOIS.

A. Spriggs, Cleve—Sword.
H. Rodda, Mangalo—Ranee.
J. C. Sims, Cleve—Ranee.

SOUTHERN YORKE PENINSULA.

H. Polkinghorne, Minlaton—Sword.
H. H. Glazbrook, Minlaton—Sword.
Alderman Bros., Minlaton—Ford, Sword.
E. H. Giles, Yorketown—Dundee, Baringa, Sword.
H. McBurney, Curramulka—Ranee 4H, Bobbin.
R. Page, Minlaton—Ford, Sword.
H. Lister, Minlaton—Sword.
L. W. Williams, Minlaton—Sword.
M. E. Correll, Minlaton—Ford.

CHANDOS.

Competitor and Address. Varieties.

J. T. W. Weiner, Lameroo—Sword.
W. H. Cabot, Parrakie—Sword.
J. H. & C. H. Spratt, Lameroo—Sword, Ranee 4H.
J. L. Koch, Lameroo—Sword.

NORTHERN.

A. M. Mahood, Wirrabara—Ranee 4H.
Blieschke Bros., Murraytown—Ranee 4H.
P. L. Blesing & R. E. Woolford, Bangor—Baringa, Dundee.
H. K. Moore, Jamestown—Ranee 4H.
W. F. Wurst, Laura—Dundee.
J. C. Kleinig, Laura—Dundee, Nabawa.
J. W. Prior, Gladstone—Ranee 4H.
M. Holland, Caltowie—Sword, Dundee.
J. E. Lehmann, Caltowie—Bencubbin.
A. Crossman, Caltowie—Bencubbin.

MIDLANDS.

D. L. Clarke, Tarlee—Sword.
J. & D. Kelly, Giles's Corner—Dundee.
G. Hazel, Kapunda—Dundee.
W. J. Holding, Eudunda—Dundee.
W. E. Hansen, Eudunda—Dundee.
P. J. Scholz, Eudunda—Sword.

MIDLANDS—*continued.*

Competitor and Address. Varieties.

C. Behn & Sons, Riverton—Dundee, Ranee, Carrabin, Waratah.
S. H. Kelly, Riverton—Dundee.
F. Coleman, Saddleworth—Waratah.
E. J. Williams, Tothill's Creek—Ranee.
H. Thomas, Manoora—Gallipoli.
Theo. Vogt, Saddleworth—Dundee.
H. H. Bulbeck, Hilltown—Dundee.
L. J. Harvey, Hilltown—Dundee.
E. V. H. Wilsdon, Andrews—Dundee.
R. F. Thomas, Hallett—Gallipoli.
Gask Bros., Gum Creek, Kooringa—Dan.
L. A. Martin, Farrell's Flat—Dundee.
R. R. Bartholomaeus, Farrell's Flat—Dundee.
J. H. Torr, Farrell's Flat—Dundee.
G. T. Przibilla, Farrell's Flat—Dundee.
H. Miller, Farrell's Flat—Dundee.
S. Garrard, Merildin—Dundee.
J. Ross, Martindale Estate, Mintaro—Ghurka.
W. R. Woods & Sons, Mintaro—Dundee.

OATS.

CENTRAL.

E. W. Day, Reeves Plains—New Zealand Cape.

Destruction of Insects.

[*The following is extracted from a paper read by Mr. C. J. Faehrmann before the Hartley Branch on "Insects and Their Attacks.*]

Cultivate and manure crops well. A vigorous growth is better able to resist attack.

Select vigorous seed that will be able to resist attack.

Do not use seed actually carrying infection, especially in potato crops, e.g., larvae of potato moth.

Practise crop rotation, so that the larvae hatched from a previous crop do not find their special food. It is not possible to rotate orchard crops, hence the difficulty of controlling insects in fruit trees.

Keep down all weeds which are likely to sustain the insect between crops. Weeds of the same natural order as the crops are the most dangerous.

Burn straw, &c., of crops, which is likely to contain eggs or larvae.

Avoid old boxes or bags likely to harbour the pest.

Frequent cultivation unearths grubs living in the soil.

Where practicable form a trench round a crop to ward off creeping insects, such as caterpillars or cutworms.

Spray with a poisonous solution containing arsenic, &c., to kill biting pests, such as beetles or caterpillars.

Placing bundles of poisoned plants or bran to attract the caterpillars is often effective.

Spraying with a corrosive solution of soft soap, resin, alkali, &c., will destroy sucking pests, *e.g.*, scale insects or green fly. It suffocates them.

Fumigation, as by carbon disulphide (CS_2), in a grain shed or potato shed (for moth), and by hydrocyanic (prussic) acid on fruit trees over which a covering can be placed is effective.

Instead of liquid washes or spray fluids, fine dry powders such as lime are sometimes dusted on.

These are vital points that should be carefully followed:—

1. Poison biting insects (arsenate of lead).
2. Suffocate sucking pests (red oil).
3. Apply at the right time.
4. Apply the mixtures at proper strength.
5. Apply them thoroughly.
6. Where the wash is too weak it may fail in its purpose, and where it is too strong it may damage the crops.

Royal Show Bureau Exhibit.

The Royal Agricultural and Horticultural Society has again allotted £400 for the Bureau exhibit at the Royal Show. The conditions for the 1937 competitions are as follows:—

Class 3,000.

£400 FOR DISTRICT EXHIBIT.

To be entered and staged by members of a Branch of the Agricultural Bureau of South Australia, and restricted to the produce of the farms of members of that Branch.

First prize	£100
Second prize	£50
Third prize	£25
To be distributed amongst exhibitors; up to	£225

based on the following scale:—

£45 to go to each Branch which secures 50 per cent. or more of the maximum marks, unless more than five Branches compete, in which case the sum of £225 will be equally divided amongst all exhibitors who are allotted 50 per cent. or more of the maximum marks. Prize winners share in this allocation.

Entries, which are received subject to the approval of the Society, should be addressed to the Secretary at the earliest convenient opportunity.

The Society reserves the unquestioned right to limit or restrict the number of entries accepted and to refuse to accept any entry without assigning any reason therefor.

CONDITIONS.

(1) Exhibits may consist of any or all of the articles referred to in the scale of points set out below.

(2) All exhibits must be actually produced and/or manufactured on the farms of members of the competing Branch, excepting that articles manufactured in the district served by the Branch, but not manufactured on the farms of members, may be displayed, but will not be taken into account in judging except under items (12) and (13) of the scale of points.

(3) Exhibits of wheat, oats and barley must be representative of a bulk of not less than 150bush. of each, and exhibits of chaff and hay representative of not less than 10 tons of each.

(4) All exhibits must be of the current season's growth, except wool, which may be of the preceding year's clip.

(5) Exhibitors will be required to make a statutory declaration to the effect that the foregoing conditions are complied with in every respect.

(6) *Space.*—The Society will provide a floor space of 45ft. by 15ft. for each exhibit.

(7) No Government institution will be allowed to participate in this competition.

(8) *Staging.*—Exhibits must be staged ready for judging by 9 a.m. on Saturday, 11th September, 1937, and may be removed on Monday, 20th September, 1937, at 9 a.m.

(9) During the progress of judging it will be necessary for the officer in charge of each exhibit to be in the hall.

SCALE OF POINTS FOR JUDGING.

(1)	Cereals (grain and in sheaf) .	150
(2)	Hay, chaff and silage	100
(3)	Wool	100
(4)	Dairy produce, bacon, hams, eggs, lard, dripping, &c. . .	150
(5)	Green fodders, grasses, &c. . .	50
(6)	All other grains and seeds . .	50
(7)	Fruits (fresh and preserved) .	50
(8)	Pickles, sauces, jams and honey	50
(9)	Vegetables and roots	50
(10)	Drinks (including wine) . . .	50
(11)	Produce not otherwise specified	50
(12)	Effective arrangement	100
(13)	Discretionary points for any outstanding feature not specifically provided for	50
	Total	1,000

Production of Butter and Cheese.

The production of butter and cheese for September, 1936, was:—Butter, 1,961,475lbs.; cheese, 1,355,123lbs.

Herd Testing Results

The supplement to this issue contains a record of:—(1) Production figures, under Official test, of pure bred cows which completed their tests during the quarter ended 30th September, 1936; (2) Herd Testing Associations (not official) production figures for months of June to September, 1936; (3) Annual production figures (not official) of the Narrung Herd Testing Association, 1935-36.

Below, Mr. H. B. Barlow (Chief Dairy Instructor) reviews the results of the various classes in the official tests.

Junior 2 Year Old (Standard, 230lbs. Fat).—In this class, 42 animals were submitted for test. 31 cows completed 273 days' test, and of this number 24, or 78 per cent., passed the required standard; 6 cows produced in excess of 350lbs. fat (mature standard), and one cow, "Pulluwewal Jean" (Jersey), made a State record with 516.66lbs. fat; 4 Jerseys and 2 Friesians passed their mature standard. The first three cows were Jerseys.

Senior 2 Year Old (Standard, 250lbs. Fat).—Seven cows were submitted; 6 completed the 273 days, and 5 passed the standard. The first 3 cows were Jerseys, headed by "Oakhill Queen" with 446.39lbs. fat.

Junior 3 Year Old (Standard, 270lbs. Fat).—Of 18 cows submitted, 14 completed the 273 days, and 8 cows passed the standard. The leading cow was "Gunawah Gold Thread" (Jersey) with 451.77lbs. fat, closely followed by "Murray Glen Inka Ashlyn" (Friesian) with 451.21lbs. fat, and another Jersey in third position.

Senior 3 Year Old (Standard, 290lbs. Fat).—There were 8 cows in this class, 5 of which completed the 273 days, and 7 passed the standard. The leading cow was "Palpara Silver" (Jersey) with 386.76lbs. fat, another Jersey and A.I.S. filling second and third position respectively.

Junior 4 Year Old (Standard, 310lbs. Fat).—Out of 12 cows submitted, 9 completed the full 273 days, and 7 passed the standard. "Murray Glen Beets Superior" (Friesian) filled first position with 558.38lbs. fat, followed by two Jerseys.

Senior 4 Year Old (Standard 330lbs. Fat).—In this class, 4 cows were submitted. Three completed the 273 days and three passed the standard. "Lakeland Fayette" (Jersey) headed the list with 478.20lbs. fat, followed by an A.I.S. and Jersey.

Mature Cows (Standard, 350lbs. Fat).—There were 50 cows submitted in this class; 37 completed the 273 days' test, and 26 passed the standard. "Anama Pontiac Queen" (Friesian) headed the list with 608.13lbs. fat, closely followed by two other Friesians. "Kiama Robin 2nd" (A.I.S.) completed a 365 days' period with 1,078.02lbs. fat (State record), and "Anama Segis Bloom" (Friesian) produced 688.76lbs. fat in the same period.

In all, 141 cows of all ages were submitted for test; 105 completed the full period of 273 days, and 80 passed the required standard.

Summarising the results for the period:—

84 Jerseys were submitted, 57 passed the standard.

23 A.I.S. were submitted, 10 passed the standard.

16 Ayrshires were submitted, 2 passed the standard.

10 Friesians were submitted, 10 passed the standard.

8 Guernseys were submitted, 1 passed the standard.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of November, 1936; also the average precipitation for November, and the average annual rainfall.

Station.	For Nov., 1936.	Av'ge. for Nov.	To end Nov., 1936.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta ..	0·06	0·35	4·12	4·62
Marree	—	0·44	3·68	5·83
Farina	0·09	0·49	3·79	6·37
Copley	0·57	0·55	4·47	7·85
Beltana.......	0·25	0·67	4·95	8·47
Blinman	0·37	0·85	5·76	11·81
Hookina	0·32	0·85	7·90	11·18
Hawker	0·35	0·91	8·43	12·22
Wilson	0·10	0·88	9·59	11·77
Gordon	0·04	0·81	6·53	10·46
Quorn	0·01	0·89	7·64	13·15
Port Augusta..	0·09	0·69	7·00	9·40
Bruce	—	0·73	10·12	9·74
Hammond	0·07	0·76	8·30	11·11
Wilmington ..	0·21	0·99	14·99	17·28
Willowie	0·09	0·77	8·60	12·22
Melrose	0·19	1·25	19·45	22·85
Booleroo Centre	0·29	0·85	10·73	15·21
Port Germein .	0·06	0·79	8·73	12·53
Wirrabara	0·32	1·09	12·18	19·25
Appila........	0·29	0·86	10·57	14·62
Cradock	0·04	0·74	7·32	10·78
Carrieton	0·05	0·81	8·67	12·19
Johnburg	0 04	0·83	8·51	10·56
Eurelia	0·07	0·96	9·02	12·76
Orroroo.......	0·14	0·95	10·44	13·20
Nackara	0·03	0·85	14·64	11·09
Black Rock ...	0·07	0·92	9·52	12·35
Oodlawirra ...	0·09	0·96	10·82	11·67
Peterborough..	0·37	0·98	10·21	13·22
Yongala	0·51	1·03	12·72	14·43
North-East				
Yunta	0·25	0·78	7·14	8·84
Waukaringa ..	0·35	0·67	7·16	7·89
Mannahill	0·28	0·76	5·80	8·16
Cockburn	0·55	0·75	7·89	7·91
Broken Hill ..	0·18	0·76	7·10	9·50
Lower North.				
Port Pirie	0·22	0·76	10·16	13·19
Port Broughton	0·49	0·72	9·58	13·85
Bute	0·53	0·78	11·53	15·39
Laura	0·21	1·04	13·14	17·97
Caltowie	0·43	1·11	11·45	16·76
Jamestown....	0·43	1·13	12·83	17·72
Gladstone	0·37	1·03	10·57	16·32
Crystal Brook .	0·49	0·90	10·58	15·76
Georgetown ..	0·36	1·01	12·13	18·29
Narridy	0·42	0·87	9·59	15·77
Redhill	0·43	0·86	13·98	16·54
Spalding	0·33	1·10	11·73	18·74
Gulnare	0·41	1·06	12·22	18·59
Yacka	0·45	0·83	11·71	15·38
Koolunga	0·41	0·79	10·21	15·32
Snowtown	0·53	0·87	13·32	15·70
Lower North—*continued.*				
Brinkworth	0·41	0·83	10·21	15·73
Blyth	0·34	0·91	13·46	16·73
Clare	0·79	1·29	21·65	24·45
Mintaro	0·59	1·13	19·13	23·36
Watervale	0·69	1·39	23·36	26·74
Auburn	0·52	1·32	19·93	23·96
Hoyleton	0·37	1·02	16·23	17·27
Balaklava........	0·12	0·94	10·79	15·43
Port Wakefield ..	0·22	0·71	10·06	12·93
Terowie	0·36	0·92	12 89	13·34
Whyte-Yarcowie	0·22	0·90	12·88	13·58
Hallett	0·31	1·04	12·90	16·41
Mount Bryan....	0·39	0·88	13·61	16·77
Kooringa	0·44	0·92	13·92	17·81
Farrell's Flat ...	0·63	0·92	16·39	18·54
West of Murray Range.				
Manoora	0·40	0·98	15·41	18·94
Saddleworth	0·63	1·13	18·33	19·59
Marrabel........	0·59	1·09	17·46	19·96
Riverton........	0·45	1·21	18·98	20·79
Tarlee	0·52	1·12	15·77	18·09
Stockport	0·36	1·06	15·02	16·97
Hamley Bridge .	0·35	0·96	13·12	16·52
Kapunda	0·36	1·14	15·96	19·76
Freeling	0·20	1·06	12·65	17·79
Greenock	0·41	1·26	16·77	21·47
Truro	0·38	1·15	15·00	19·79
Stockwell	0·34	1·22	15·68	20·04
Nuriootpa	0 71	1·15	18·17	20·68
Angaston	0·59	1·28	17·86	22·32
Tanunda........	0·62	1·20	17·39	21·94
Lyndoch	0·48	1·21	15·45	23·27
Williamstown ...	0·64	1·37	17·92	27·61
Adelaide Plains.				
Owen	0·27	0·84	14·03	14·64
Mallala	0·18	0·94	12·04	16·49
Roseworthy	0·24	1·02	12·55	17·42
Gawler	0·19	1·05	13 00	18·85
Two Wells	0·17	0·85	10·84	15·76
Virginia	0·17	0·96	12·63	17·20
Smithfield	0·36	1·03	12·96	17·65
Salisbury	0·31	1·03	11·71	18·56
Adelaide	0·54	1·15	15·76	21·14
Glen Osmond....	0·51	1·24	18·57	25·97
Magill	0·58	1·25	17·16	25·37
Mount Lofty Ranges.				
Teatree Gully ...	0·87	1·47	16·26	27·07
Stirling West ...	1·82	2·13	35·95	46·95
Uraidla	1·43	1·91	31·19	43·95
Clarendon.......	1·10	1·55	25·92	32·79
Happy Val'y Res.	0·70	—	19·09	—
Morphett Vale ..	0·59	1·23	17·04	22·59
Noarlunga	0·41	1·03	16·97	20·33
Willunga	0·67	1·22	18·81	25·97
Aldinga..........	0·55	0·96	15·74	20·21

RAINFALL—*continued.*

Station.	For Nov., 1936.	Av'ge. for Nov.	To end Nov., 1936.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	0·99	1·39	21·76	29·42
Inman Valley	0·94	—	23·32	—
Yankalilla	0·80	1·07	17·51	22·76
Mount Compass	0·80	1·88	26·25	—
Mount Pleasant	0·48	1 31	21·65	27·11
Birdwood	0·48	1·41	19·57	29·07
Gumeracha	0·76	1·65	20·40	33·31
Millbrook Res.	0·84	1·60	21·84	34·47
Lobethal	0·70	1·61	25·72	35·91
Woodside	0·46	1·49	22·20	32·15
Hahndorf	0·73	1·60	24·21	34·77
Nairne	0·58	1·41	21·28	28·12
Mount Barker	0·85	1·50	23·17	31·24
Echunga	0·95	1·60	27·83	33·25
Macclesfield	0·57	1·67	24·13	30·34
Meadows	0·87	1·87	28·62	36·02
Strathalbyn	0·41	1·09	17·34	19·32
MURRAY FLATS AND VALLEY.				
Meningie	0·46	1·02	16·06	18·31
Milang	0·38	0·91	13·53	14·89
Langhorne's Ck	0·22	1·03	14·80	14·91
Wellington	0·37	0·93	14·29	14·65
Tailem Bend	0·27	0·93	15·27	15·06
Murray Bridge	0·19	0·87	12·50	13·51
Callington	0·35	0·91	12·74	15·15
Mannum	0·19	0 70	10·72	11·48
Palmer	0·14	0·92	15·89	15·59
Sedan	0·12	0·70	9·28	12·05
Swan Reach	0·14	0·69	8·89	10·65
Blanchetown	0·23	0·73	9·34	11·01
Eudunda	0·50	1·07	16·39	17·15
Point Pass	0·56	0·75	17·84	16·72
Sutherlands	0·24	0·77	9·75	10·81
Morgan	0·27	0·63	7·64	9·16
Waikerie	0·28	0·65	10 88	9·66
Overland Corner	0·18	0·77	9·65	10·25
Loxton	0·25	0·69	10·10	11·50
Berri	0·11	0·55	10·24	10·13
Renmark	0·10	0·73	11·11	10·38
WEST OF SPENCER'S GULF.				
Eucla	0·92	0·65	8·22	10·02
Nullarbor	0·32	0·57	5·17	8·85
Fowler's Bay	0·25	0·59	8·63	11·19
Penong	0·47	0·60	9·43	12·22
Koonibba	0·48	0·69	10·11	12·09
Denial Bay	0·44	0·60	10·03	11·19
Ceduna	0·37	0·65	8·76	10·21
Smoky Bay	0·25	0·55	7·88	10·42
Wirrulla	0·37	0·60	7·28	10·51
Streaky Bay	0·36	0·67	10·51	14·85
Chandada	0·47	0·77	7·30	12·42
Minnipa	0·48	0·74	10·02	13·91
Kyancutta	0·38	0·81	9·85	12·77
Talia	0·40	0·66	9·97	14·76
Port Elliston	0·59	0·70	11·35	16·51
Lock	0·36	1·01	10·73	16·34
Mount Hope	0·55	—	13·08	—
Yeelanna	0·75	0·66	11·06	15·94
Cummins	0·59	0·77	12·10	17·58
Port Lincoln	0·48	0·85	13·40	19·37
Tumby	0·63	0·86	9·98	14·25
Ungarra	0·93	0·94	12·62	16·87
Port Neil	0·59	0·87	9·77	13·11
WEST OF SPENCERS GULF—*continued.*				
Arno Bay	0·55	0·74	8·80	12·71
Rudall	0·37	1·00	8·69	12·98
Cleve	0·33	0·93	10·80	14·88
Cowell	0·24	0·69	10·10	11·07
Miltalie	0·55	0·88	11·38	13·70
Mangalo	0·27	0·84	11·95	13·86
Darke's Peak	0·47	0·80	10·34	15·08
Kimba	0·53	0·67	7·68	11·68
YORKE PENINSULA.				
Wallaroo	0·20	0·72	9·81	13·97
Kadina	0·30	0·74	10·38	15·60
Moonta	0·30	0·76	9·69	15·06
Paskeville	0·31	0·73	13·86	15·47
Maitland	0·42	1·01	12·50	19·85
Ardrossan	0·31	0·77	9·96	13·95
Port Victoria	0·69	0·82	10·81	15·41
Curramulka	0·76	0·85	12·74	17·81
Minlaton	0·79	0·91	12·59	17·74
Port Vincent	0·51	0·78	9·96	14·38
Brentwood	0·91	0·85	11·38	15·54
Stansbury	0·80	0·84	12·42	16·81
Warooka	0·67	0·79	12·91	17·44
Yorketown	0 74	0·85	11·85	16·83
Edithburgh	1·05	0·89	11·46	16·37
SOUTH AND SOUTH-EAST.				
Cape Borda	0·45	0·98	21·29	24·80
Kingscote	0·56	0·92	14·39	19·16
Penneshaw	0·54	1·04	15·95	19·00
Victor Harbour	0·52	1·10	16·60	21·40
Port Elliot	0·59	1·10	17·58	19·94
Goolwa	0·61	1·06	17·05	17·86
Maggea	0·24	0·52	10 97	10·20
Copeville	0·17	0·72	14·03	11·53
Claypans	0·16	0·54	11·38	10·42
Meribah	0·17	0·50	11·76	11·32
Alawoona	0·16	0·48	11·31	10·40
Caliph	0·08	0·66	10·09	10·98
Mindarie	0·13	0·78	17·98	12·23
Sandalwood	0·18	0·87	13·56	13·64
Karoonda	0·15	0·75	13·43	14·17
Pinnaroo	0·24	0·98	11·72	14·36
Parilla	0·20	0·85	12·87	13·72
Lameroo	0·25	0·96	14·04	15·87
Parrakie	0·21	0·84	12·24	14·56
Geranium	0·22	0·93	12·96	16·36
Peake	0·40	0·84	12·25	15·93
Cooke's Plains	0·33	0·89	14·69	15·28
Coomandook	0·41	1·05	14·51	17·03
Coonalpyn	0·45	1·02	16·65	17·61
Tintinara	0·15	1·17	16·08	18·62
Keith	0·29	1·16	16·44	17·93
Bordertown	0·48	1·22	17·22	19·14
Wolseley	0·32	1·13	17·19	18·47
Frances	0·47	1·28	18·26	20·08
Naracoorte	0·35	1·38	18·49	22·63
Penola	0·48	1·54	20·57	25·96
Lucindale	0·66	1·22	22·64	23·38
Kingston	0·42	1·21	21·74	24·24
Robe	0·29	1·07	22·00	24·64
Beachport	0·48	1·16	24·74	27·06
Millicent	0·87	1·47	29·20	29·83
Kalangadoo	0·91	2·06	27·42	32·20
Mount Gambier	0·71	1·75	23·91	30·37

Agricultural Bureau of South Australia

Reports Received from Branches

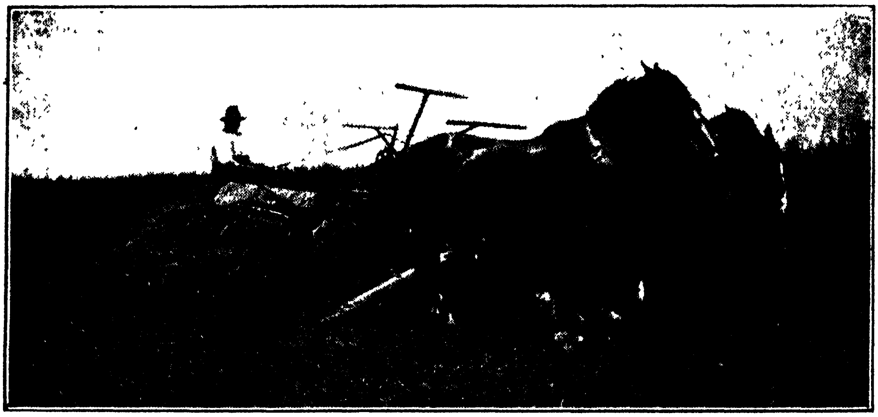
The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Balumbah, 4th November, "Fodder Conservation" — C. Jericho; Baroota, 12th October, Congress Report; Beetaloo Valley, 26th October, Travel Talk —W. Hill; Belvidere, 29th October, Field Day and Social; Blackheath, 5th November, Paper from *Journal*; Blewitt Springs, 3rd November, "Bees"—A. E. Ophel; Booleroo Centre, 23rd October, "Fencing"—W. A. Mills; Brimpton Lake, 13th November, "Sidelines"—G. Haines; Butler, 26th October, Formal; Cambrai, 7th October, Congress Report, 4th November, "Sheep Dipping"—E. H. Schirmer, "Bees"—N. Harris; Chandada, 19th October, Discussion; Cherry Gardens, 23rd October, Life Membership Presentation; Coomandook, 20th November, "New Zealand"—R. C. Scott; Coonalpyn, 28th October, Papers from *Journal*; Eurelia, 28th October, Congress Report; Goode, 28th October, Congress Report; Ironbank, 4th November, "Prunes"—F. B. James; Kelly, 7th November, "Wheat Breeding"—G. T. Parsons; Kyancutta, 3rd November, Conference Report; Lameroo, 20th October, Address—R. L. Griffiths; Laura Bay, 10th November, "Edward J. Eyre's Journey to Albany"—G. Berry; Light's Pass, 26th October, "Frost Prevention"; Lyndoch, 27th October, "Looking Backward"—F. E. Waddy; Maltee, 29th October, "Farm Bookkeeping"—J. B. Talbot; McLaren Flat, 29th October, Visit to Sugar Refining Company; Meadows, 3rd November, Discussion; Millicent, 25th September, "The Sparrow Pest"—E. Sapiatzer, 9th October, "Silage"—E. S. Alcock, 23rd October, Congress Report; Miltalie, 9th November, Question Box; Morchard, 30th October, Debate, "Tractor *v.* Horses"; Mount Hope, 10th November, "The Weather"—A. J. Vigar; Nantawarra, 5th November, Paper from *Journal*; Penola, 20th November, Formal; Pinnaroo, 14th August, "Education for the Farmer"—A. O. Nietz; 25th September, Congress Report; Pinnaroo, 6th November, Paper from *Journal*; Ramco, 5th and 26th October, "Bookkeeping"—A. E. Seary; Rosedale, 26th October, Congress Report, 5th November, Social; Springton, 4th November, Address—M. W. Aird; Strathalbyn, 27th October, Papers by High School Boys; Tantanoola, 14th November, Formal; Truro, 17th November, "Agricultural High School Course"—A. R. Ninnes; Upper Wakefield, 29th October, Annual Meeting; Warcowie, 27th October, Congress Report; Warramboo, 27th August and 25th September, Formal; Wepowie, 26th October, "Trip to New South Wales" —E. P. Yeatman; Williamstown, 30th October, "Vegetables"—Mr. Roediger; Wilmington, 10th November, "Phosphate Industry"—E. B. Heyne; Wudinna, 31st October, "Improving Sheep-carrying Capacity"—C. White; Yadnarie, 27th October, "Farm Horses"—P. G. Fiedler.

Harvesting Operations.

[C. Bottrall, Appila.]

Just before a farmer starts hay-cutting, he should spend some time walking through his crops, and pick out the best parts for hay. If this is left until he is on the binder, he will probably cut in places that would make best wheat crops. Water courses should claim particular attention, because in water courses crops are, in most cases, tall and top heavy and are easily wrecked by wind, rain, and floods.

Hay carting is very important, because the hay is in the stack for a considerable time in some cases, and if not properly stacked or stored it will deteriorate and cause loss of time and money when the stack is opened. If the hay is left lying on the ground a day or so before stooking, it will be found to be more easily handled and will not take so long to dry. Hay should be left in the stook long enough for the middle to dry, but not dry enough to be brittle. Hay should not be put in



the stack too soon and above all should not be put in wet. If light rains should fall during the building of a stack, salt sprinkled all over the stack will prevent mould, but should a lot of rain fall, it is then necessary to dry the top sheaves.

Reaping.—Taking for granted that the the machines are in good working order (this, by the way, is where the farmer benefits from the slack period being spent repairing his machinery), the beginning of summer is very often the best time to get the most wheat off, as the storms generally set in early in the new year. If a farmer does not get busy early he is liable to be caught by these storms. It pays a farmer to employ a man to sew his bags. If the sewing is left until a wet day or a cool change, these may not occur, until there are hundreds of bags standing about in the stubble. Should this happen and a severe storm breaks or a fire starts in the stubble, the farmer loses time and money. In the end he will have saved himself a lot of worry by employing a man. Although harvest time calls for hurry, it is extremely necessary that plenty of oil be used on the machinery. After the harvest is finished the machinery should be put under cover as soon as possible, because of wood that will crack and warp, and hollow places where water will accumulate. If there is some chaff and rubbish in these places, the water will not dry up for a considerable time and consequently the tin will rust through; and if not located, will waste wheat another year. The machine should be cleaned of all grease and rubbish, before it has time to harden, and so give free access to the oiling of the parts another year. Wheat should claim particular attention and should be cleaned out of all places, as rats will harbour and block up elevators and spouts with nests, etc. A list should also be taken of all breakages and defects originated during the harvesting, so that when overhauling before the next harvest one will know just what is needed.

Topping and Disbudding Vines.

[J. Wuttke, Waikerie.]

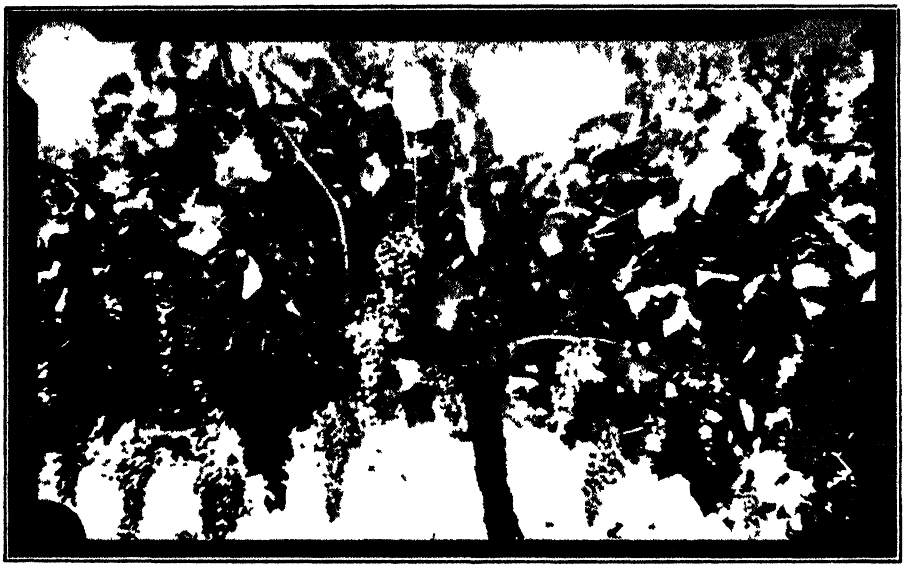
Following a demonstration given by Mr. Vollaire some 3 or 4 years ago on Mr. Schenke's block on the topping of the sultanas, I decided to give this a good try out. As the system appealed to me, I decided to do currants and Gordos also. I thought if it was beneficial for the former, why not also for the latter two?

Now, before touching on the system of topping, I would like just briefly to refer to the action of the vine in its own development, which should really be taken into consideration when topping. In the first place the roots of the vine take up the raw or undeveloped plant food from the soil, send it up through the pores of the wood to all the leaves all over the vine. The leaves—through some chemical action—turn this substance into liquid wood, and distribute it to all parts of the vine between the bark and the wood, and to the farthest tips of the roots underground. From this action, we can see that the leaves are vitally necessary for the development of the vine and its roots. It also shows that damage can be done by topping indiscriminately. The idea of topping is to take off just the unnecessary growth, and the time to take this off is when it is in the transparent stage. When in this transparent stage, the growth feeds on the vine, but later when the leaves become dark-green or mature, they become useful and feed the vine. So when topping is done, only the transparent part should be knocked off. So as not to top too severely, I find that I have to go over them 3 times at different periods. I start on the Sultanas when some of the shoots are about 1ft. long, and top the ones that are getting away from the others. This gives the weaker ones, which would be kept crowded back, a chance to come on. Of course at this first topping, I touch nothing at or near the crown.

At the second topping, some of the crown shoots are long enough to be topped, and I also top odd shoots along the wires that have come out since the first topping. At the third topping I top off the shoots on the crown that were not long enough at the second topping.

I generally find that topping in this manner gives all buds a chance to come out, prevents strong shoots from smothering weaker ones, and gives the vine a nice even-ventilated cover of foliage. This is especially beneficial to Gordos, as these are very susceptible to sunburn during hot weather. I might mention that since I have adopted topping, I have had no trouble with sunburn in Gordos.

Some might think that if foliage is vitally necessary and does all the important work of developing the vine and the fruit, why top any, and not leave it all on? However, if you are going to grow a lot of unnecessary wood, which takes a lot of sap to mature, and at pruning time has to be thrown away, it is better to conserve it in time, and make it an abundance for the necessary growth and the fruit



I have now been topping for 3 or 4 seasons, and so far as I can now see, the vigour of the vines has increased. It also seems to give a better setting of berries, and the growth being moderately open and off the ground, the air circulates all around the vine, and it is not so liable to diseases

Fencing.

In a paper read before the Booleroo Centre Branch Mr. W. A. Mills stated that he preferred using wooden posts 11yds. apart with 2 flat iron standards between each post. He had used T-iron standards, but had found that if a standard was bent by a beast reaching over the fence the iron snapped at the bottom hole when one attempted to straighten it. Fence wires should consist of a bard at the top with 5 steel wires beneath. Where big stock were kept the fence should not be too low, and preferably about 3ft. 8in. high, with wires spaced at 6in. from the ground, 6in. 6in. 7in., 9in., and 10in. The length of strains could be conveniently divided accorded to the line of fence, but should not be much more than 7 chains. Strainer posts should be placed 3ft. in the ground in the case of line strainers, and 3ft. 6in. in the case of corner posts. Ordinary fence posts should be not less than 20in. in the ground, and all posts should be well rammed in the bottom of the hole. It was impossible to get posts firm by filling in the hole before commencing to ram. Strainer posts should be well stayed; it was advisable to place the stay as near as possible to the top of the post in order to give as much purchase as possible. In purchasing wire for a new fence a serviceable gauge for the steel wires would be 3 No. 10 galvanized wires at the bottom and 2 No. 8 black wires above. If the fence was being erected in a paddock where large stock would run, such as in small paddocks, it would pay to use heavy-gauge barbed wire, as light-gauge wire would stretch and constantly break. The fence described above would be a good all-round fence for sheep and cattle. Many fences consisted of only 5 wires. They were not sheep-proof, and would make "crawlers" of the sheep.

Fences could be improved by the use of good, serviceable gates. Wood and iron gates were expensive to buy, but a serviceable gate could be made of wires with several wooden droppers placed fairly close together in order to prevent the wires from becoming tangled. A piece of hoop-iron placed around the bottom of the post would hold the upright, and a wooden lever with a few links of chain would enable the gate to be pulled up firmly. It was advisable to place a link at each end of the wires. If the wires were fastened direct to the uprights at each end they would be repeatedly breaking.

Frost Prevention.

At a meeting of the Light's Pass Branch members discussed their experiences during the recent frosts. Members were definitely of the opinion that it would pay to fight frosts by heating on the lines of experiments conducted under Departmental supervision in Light's Pass gardens. Members pointed out mistakes made in the recent frosts, and admitted that there was much to be learned yet regarding heating. It was agreed that the scheme of heating was quite efficient, and that the temperature could be raised by the use of 70 pots per acre burning for 4 hours at a cose of 6d. per pot for oil, *i.e.*, £1 15s. per acre. Heating would be well worth while in the case of a good crop of apricots or grapes. Statistics proved that the district did not experience a long sequence of frosts, only one or two per year occurring during the danger period to fruit and vines. The frost on 25th September was exceptionally severe in the Light's Pass district. One observer noted that there was an average of 5 degrees of frost for 5 hours during that night. Frosts followed on 26th and 27th September, but an inspection of the gardens where heating experiments had been in progress showed that they had met with a great deal of success. Good, reliable thermometers were essential in combating frost, and fires should be lighted immediately the temperature fell to 32 degrees. Ultimately fire pots and oil buckets would become part of an orchardist's equipment. Many gardens at Light's Pass were being equipped with frost-fighting apparatus as initially experimented with by the Light's Pass Agricultural Bureau.

Homestead Meeting at Miltalie.

A very successful Homestead Meeting was held at the property of Mr. H. R. Jacobs on 17th October. Members of the Miltalie Branch assembled at 3 p.m. and inspected Mr. Jacobs's garden, which contains some valuable trees. The visitors then made their way to the wool shed and inspected the sheep, including a good-framed Corriedale ram used for breeding fat lambs for export; also some valuable Merino rams were noticed. Members were interested in the sheep dip, especially in the method employed in running the sheep into the dip. A demonstration of fumigating rabbits was then given. A few green bushes, pieces of rubber, and a blower were used, blowing smoke into the holes and suffocating the rabbits. Returning to the house, members partook of tea provided by Mrs. Jacobs, after which Bureau matters were dealt with.

Question Box.

The following questions were discussed at a meeting of the Springton Branch on 7th October:—"What is the best depth to plough for crops in this district." Members favoured a depth of 3in. One member quoted an instance of a paddock worked up with a sundercut to a very shallow depth, and which had produced the heaviest crop he had seen in the district. "Is the emasculator an improvement on the knife for treating lambs?" One member had had experience with the emasculator, and was favourably impressed with it. "Would it be possible for South Australian wheatgrowers to concentrate on fewer varieties than are grown at present?" The various wheats were suited to conditions in the different localities. "Is blade or machine shearing more suitable for the district?" Members favoured blade shearing. Machine shearing was thought to be severe on sheep during cold weather.

Increasing the Sheep Income.

[Messrs. White and Johns, Wudinna.]

An increased income can be achieved by one of two methods. The first is by dealing in sheep, which does not appear to be successful with more than a few who have a natural aptitude for buying and selling. The other method is that of breeding and maintaining a flock for wool and lamb production.

The Farm Lay-out.

The writers strongly favour the expenditure of capital in providing adequate fences, dividing the farm into 100-acre fields, with a scheme of water reticulation, so that water is available in all paddocks. In very hot weather sheep feed during the evening and early morning, lying quiet during the day. Where they have to travel a long distance for water during the early morning they miss a feed. With large paddocks only the choicest and most palatable feed can be eaten if the flock is small, resulting in much feed becoming coarse and going to seed. Small paddocks can be fed off quickly and well, the sheep then being moved to the next paddock in rotation, returning later to find a fresh growth of young, succulent feed in its most nourishing form.

Fences.

Fences of the Cyclone type are suitable for temporary subdivision when finances will not permit of permanent fences. However, the increased income resulting from closer subdivision would in a few years pay for the permanent fencing and water layout. Good yards, convenient for handling the flock, should be provided, in order to economise in time taken in personal attention.

Methods of Providing Feed.

To provide suitable feed, the following methods may be adopted:—The sowing of cereals for greenfeed in the form of oats, barley or rye; the sowing of Wimmera rye grass or lucerne. Oats will prove a valuable greenfeed, provided that the best variety is used. Wimmera rye grass is easily established, re-seeds freely, and if top-dressed annually will produce a large quantity of greenfeed, particularly when good rains fall during September and October, when it will often remain green and fresh until harvest time. Lucerne is the best of all for nourishment and enrichment of the soil, but it is hard to establish, and requires careful feeding. Clovers, of which the only one worth much to mallee farmers is burr clover, should be encouraged at all times.

The writers do not favour the idea of allowing fallows to become dirty, with the double object of keeping a larger flock and also of growing more wheat per acre at the same time. Prolonged feeding of sheep on fallow brings the attendant evils of dirty wool, drift, and hungry, leg-weary sheep.

Topdressing pastures composed of Wimmera rye grass and burr clover with super at the rate of 40-50lbs. will pay handsomely, and will help indirectly in controlling take-all. Feed sown with super supplies the flock with a necessary constituent in the diet which it is difficult to obtain otherwise, and the lack of which is said to cause disease.

Fodder Conservation.

Oats stored in bins form an efficient and economical standby. Ensilage making entails much labour in handling, both in its green state as well as in feeding.

Selection of Flock Ewes and Rams.

The only sound practice is to judge a ram by its progeny. If it is suitable and is producing sheep of large frame and good constitution, practice line-breeding and cull heavily until the flock reaches the desired type. When prices up to 15s. are paid for Merinos, the production of lambs becomes highly remunerative, and does not encourage one to desert the Merino for the crossbred. One of the most vexed questions regarding lamb production is that of the best mating time for the lambing ewes. Results will depend mainly upon an early or late break in the season. Therefore, many farmers will continue to base their mating time upon a forecast of the weather and, as the success of oats and greenfeed sown to provide for the lambs also depends upon the season, farmers are perhaps justified in this gamble.

Losses.

Losses should be kept as low as possible. The deaths that occur on many farms are far too high, and unless frequent counts are taken often pass unnoticed, especially deaths among the young lambs. The chief losses occurring in the mallee are from toxaemia and twin-lamb disease, both of which are difficult to prevent, apart from vaccination, of which we have had no experience. Losses also occur because of the blowfly, but these losses can be prevented by methods known to all. Foxes and dogs account for other losses. A lamb drop of at least 80 per cent. could be attained on small farms, and these lambs should be brought to maturity.

Marketing.

Handling a small flock of ewes, the writers have averaged 10.8lbs. per ewe of AA quality wool. Strict line-breeding and culling must be practised in order to improve the clip; the rest is in the feeding, which is the most important of all. The practice of leaving the rams in the flock all the year decreases the yield and quality of the wool. There is more profit in a small flock of well-maintained sheep than is gained by over-stocking. Struggling to feed sheep never even in store condition brings constant anxiety to the owner at each dry spell, and results in low returns at the wool sales. The improvement of a flock, as all sheepmen know, is a gradual rather than a mushroom-like process, but an increased income can be obtained at a quicker rate from attention to feed problems.

Bulk Handling of Wheat.

[*Extracts from an address given by Mr. J. M. McDonald before a meeting of the Owen Agricultural Bureau.*]

Some years ago a system of bulk handling was introduced into New South Wales and this has been extended until most of the principal wheat-growing centres are served by it. Extensions of the bulk-handling facilities are still being carried out in that State. As far as can be ascertained the system gives general satisfaction, but the operating costs are heavy. The New South Wales system has been modelled principally on American and Canadian lines, and includes substantial country silos and a terminal plant of considerable capacity at Sydney. For this, and other reasons, the capital cost has been high.

About 10 years ago a specially-appointed Committee closely inquired into the New South Wales bulk-handling system on behalf of the Victorian Government, but reported adversely on its introduction into their own State on account of the formidable capital outlay required. Since then, however, a modified scheme has been approved by the Victorian Government, and a board of control appointed. It is expected that the work of installation will begin soon.

The position in South Australia appeared even less favourable to the introduction of bulk handling on account of the smaller wheat yield than that in the Eastern States and the multiplicity of shipping ports. The coming of the period of financial stringency resulted in the matter being shelved, apparently for an indefinite period, as the provision of the large sum of money required to inaugurate an effective bulk-handling system seemed quite beyond the ability of any Government or private enterprise.

It was left to the co-operative organisations in Western Australia to revive the matter. The results of their investigations and experiments have shown that an efficient and economical scheme of bulk handling is practicable.

There are two important factors which the Western Australian organisation have regard to throughout; one is that wheat, being a low-value commodity, demands cheap means of handling, and the other, that large terminal accommodation is not necessary. Storage facilities are much cheaper to provide in the country than at shipping ports.

Experiments on a modified scale were conducted in Western Australia in 1930 and 1931, and aided by the knowledge gained thereby, it was decided to establish bulk depots at five points for the receival of wheat during the 1931-32 season. Since then the number of stations equipped for bulk wheat has been increased to 53, and a separate organisation, Co-operative Bulk Handling, Ltd., formed to conduct the system.

After considerable delay and in spite of much opposition Co-operative Bulk Handling, Ltd., has secured from the Western Australian Government a charter to install bulk facilities throughout the wheatgrowing areas. Work is to start immediately on an additional 100 installations in the Fremantle and Geraldton zones.

Briefly the system in operation in Western Australia is as follows:—

Ordinary wheat sheds are prepared for the reception of wheat in bulk by being strengthened by the introduction of additional posts and walled with galvanized iron or timber and sufficiently stayed. Concrete or wooden floors are also provided. To accommodate wheat received in excess of the shed capacity temporary storage bins are constructed of timber and roofed with iron. These do not reach more than a few feet from the ground. Wheat for delivery in bulk is brought in by farmers either in bags or box trucks or wagons. Various devices are used for temporarily closing bags, or they may be left unfastened.

After weighing over weighbridge the wheat is emptied into a bin or pit by the farmer, who retains the bags for further use.

Elevators of a mobile and inexpensive type are used to move the wheat from the reception bin to the shed or direct into trucks as may be required. These elevators are also used for moving wheat from sheds to trucks.

The railway trucks in Western Australia are not adapted for bulk wheat transport, having low sides, which must be raised by the addition of canvas extensions. These extensions have to be provided by the handling company, which must also pay freight on them when they are returned with the empty trucks. The Western Australian Railways impose an additional charge of 9d. per ton on bulk wheat.

Much of the rolling-stock of the South Australian Railways could be adapted to the carriage of wheat in bulk without considerable expense. This applies especially to trucks on the broad-gauge lines. It has been proved that the high-sided steel trucks can be loaded with bulk wheat beyond the minimum required by the Railways Department. The policy of the South Australian Railways as regards freight on bulk wheat is not known, but there appears no justification for any additional freight charge.

The charges made by the Bulk Handling Company in Western Australia are 1⅛d. per bushel plus approximately ¼d. per bushel if the wheat is shipped. A toll of ⅝d. per bushel is levied to cover the capital cost of the installation, which will ultimately become the property of the farmers using it. Each farmer is credited with the amount of tolls collected on his wheat, and it is presumed that he will eventually receive shares in the concern representing this amount. A storage charge of one-tenth of a penny per bushel per month is made on wheat not removed by the end of February.

In Western Australia farmers found that their crops could be handled with relatively few bags, and they were also saved the cost of twine and labour for sewing. Substantial savings in money have resulted, and records kept by a number of growers show that the benefit amounts to about 2d. per bushel.

The inauguration proved so popular amongst the farmers in Western Australia that the estimates of receivals were greatly exceeded, many farmers electing to cart their wheat past sidings where only bagged wheat was received in order to avail themselves of the bulk system. Some are said to have carted their grain as far as 30 miles to reach a bulk depot.

It will be realised that the provision of storage accommodation at shipping ports is a most important factor in any bulk-handling scheme. Suitable waterfront sites may be difficult to secure, and will probably be costly to rent from the harbour authorities. If the proposed structures are to be high, the cost of foundations necessary to support the very great weight would be considerable. In view of the extra despatch with which trucks could be loaded and unloaded, it is not considered that anything more than a reasonable reserve stock of wheat would be required at each port. The cost of making this provision should not be excessive.

The mobile elevators in use in Western Australia are capable of handling a ton of wheat per minute, the largest truck in use in South Australia could thus be loaded comfortably in one hour. The facility of transport thus achieved will be obvious.

Another point to be considered is shipping. Owing to the much more expeditious loading, shipowners are prepared to accept 2s. 6d. per ton less for bulk wheat; the time of loading is reduced to approximately one-sixth of that required under the bag system. This amounts to about ¾d. per bushel and compensates for most of the additional handling costs between the farmer's wagon and ship's hold.

Opponents of the bulk system declared that bulk wheat would have to be sold at a discount overseas as buyers there preferred wheat in bags. That this contention is untrue has been proved by recent experience. Prices for bulk and bagged wheat in the overseas markets are almost invariably the same.

It has been found that where bulk facilities are available at country sidings farmers' bag requirements are reduced to at most an eighth of former numbers. About a quarter of the normal number of bags are sufficient to handle the crop, and they will last for at least two seasons. Some farmers have found that their washed super bags have been sufficient for their needs, while those having a box truck or wagon have no need to buy bags at all.

South Australia is now practically the only wheat-exporting country of consequence in the world without bulk-handling facilities. Argentina has recently adopted bulk handling and, as has been indicated, an installation is in progress in victoria. In Turkey, which is not regarded as an important producing country, wheat is handled in bulk.

Bulk shipping has been practised in South Australia for some time, but it is rather an expensive method, bags having to be cut open on the ships' decks and the wheat shot into the holds. This is done to secure the lower rate of freight, but because of the cost involved farmers do not get the full benefit of the saving, and they are still under the necessity of buying bags. During the period from December, 1935, to June, 1936, every full cargo of wheat shipped from South Australian ports has been in bulk, except shipments in sailing vessels, which are not equipped to carry bulk cargoes.

Profitable Dressings of Superphosphate.

[A. E. SCHAEFER, Pinkawillinie.]

While the necessity of using some super in crop production in our district is generally admitted, there is a wide difference of opinion as to what constitutes the most profitable dressing.

The Department of Agriculture has conducted many experiments under field conditions otherwise similar but using varying quantities of super. These have invariably shown improved results from higher dressings, which appear economical up to 2cwt. per acre, though doubtful at 3cwt. per acre. Many people will be surprised to hear how little extra wheat need be produced per acre to pay for heavier dressings of super.

At the present price of super (£3 12s. 6d. per ton f.o.r., Port Lincoln), freight to Buckleboo at 13s. per ton, and allowing 10s. 6d. per ton for carting from the siding to the combine or drill, super costs £4 16s. per ton, or 8s. per bag at the drill. This equals 8d. for 15lbs. of super.

With wheat at 2s. per bushel on the farm, the following table shows how much additional wheat must be grown to pay for every additional 15lbs. of super used within limits usual in this district, and assuming that 30lbs. will produce 6bush. per acre on a given piece of ground:—

Lbs. Super.	Costing. s.	d.		Bush.	Lbs.
30	1	4	produces ...	6	0
45	2	0	must produce	6	20
60	2	8	must produce	6	40
75	3	4	must produce	7	—
90	4	0	must produce	7	20
105	4	0	must produce	7	40
120	5	4	must produce	8	—

In other words, when wheat is worth only 2s. per bushel on the farm (about 2s. 3d. at the siding), it takes only 20lbs. of wheat to pay for every 15lbs. of super used.

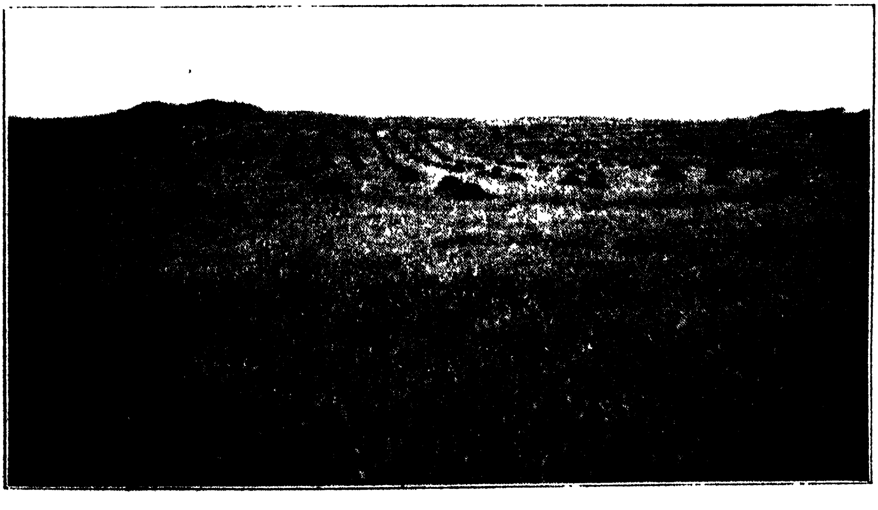
When wheat is 3s. per bushel it takes only 13⅓lbs. of wheat more to pay for every extra 15lbs. of super used; and when wheat is 4s. per bushel on the farm (as it is to-day), only 10lbs. of wheat extra are needed to balance every extra 15lbs. of super used.

Thus with wheat at 4s. per bushel and assuming a piece of land able to produce a 6bush. crop with 30lbs. of super costing 1s. 4d., it would need to produce the following returns for every additional 15lbs. of super:—

Lbs. Super.	Costing. s.	d.		Bush.	Lbs.
30	1	4	produces ...	6	—
45	2	0	must produce	6	10
60	2	8	must produce	6	20
75	3	4	must produce	6	30
90	4	0	must produce	6	40
105	4	8	must produce	6	50
120	5	4	must produce	7	—

This is surely an unchallengeable argument in favour of heavier than average dressings.

Again assume a very favourable season when 30lbs. of super would produce 12bush. under given conditions, then only 13bush. are necessary to balance additional expenditure for a dressing of 120lbs. with wheat at 4s. per bushel on the farm; also 14bush. will still balance accounts for the extra 90lbs. of super when wheat is only 2s. per bushel. Again, if 90lbs. of super produces 20bush. per acre, 120lbs. must produce another ⅔ a bushel of wheat at 2s. per bushel, and only ⅓ of a bushel at 4s. per bushel.



The lump cost of super looms high in our annual expenditure, yet viewed as indicated above it is one of our easiest items and is sure to reimburse itself.

I wish to stress the value of heavy super dressings in subsequent pasture growth on wheat lands and the retention of general soil fertility. Wheat sickness is deferred, the risk of Take-all greatly reduced, while a valuable effect in reducing soil drift in sandy lands is also achieved.

White Ants and their Extermination.

[E. W. HOFFMANN (South Kilkerran).]

Of all the insects we have to contend with, one of the most destructive is the white ant. These little insects work away quietly and very frequently are not discovered until quite extensive damage has been done.

Let us take a glance at a white ant's nest and see the different kinds of ants in it and their various duties. This will enable us to understand why some treatments, particularly local ones, which will kill any ants they come in contact with, do not rid the ants from buildings, &c., but frequently cause them to re-appear in other parts. The habits of a white ant colony are practically the same as those of a hive of bees. They have their queen, their workers, their soldiers, and also a male ant called the king ant.

On examining a white ant nest one finds first an outside layer of very coarse workings honeycombed with coarse tunnels surrounding the whole. Inside this the tunnels gradually decrease in size, as also do the partitions in thickness. The queen is usually found in this outside layer. The purpose of the queen is to lay eggs. These eggs are taken into the inner core of the nest and gradually hatch out and are looked after and guarded by ants which never leave the nest. A well-developed queen is on an average about 1in. to 2in. long and capable of laying 60 eggs a minute.

The worker is the ant which goes out from the nest, builds the tunnels to anything they wish to attack for food, and brings this food back to the nest for the use of the queen and young ants which are developing from the egg stage. This worker will, under normal conditions, do his trip from the nest and back in about 24 hours.

The soldier ant is a necessary companion to the worker, because he it is who supplies the moisture for them in their work. This moisture is an acid which will soften wood, cement, lead, or any hard substance, and also corrode steel or glass. This acid is the reason why ants are able to penetrate anything which comes in their way. They certainly have not the power in their jaws alone to eat their way through hard substances, but by the use of this acid they are able to do so, cement floors covered with linoleum being frequent cases and proof of the strength of this acid. Besides helping the worker the soldier ant is also the defender of the home.

Each colony of ants will, during the spring and summer months, put out about three swarms of young ants. Usually these ants will leave a tunnel some distance from the nest on a warm, sultry evening. These ants are what are commonly called flying ants. A young queen, about two or three times the size of the ants which leave the hive with her, will fly until she hits some obstruction or settles on the ground. She then loses her wings, gets under cover with some of her swarm and immediately begins a new colony for herself. Any ants which are separated from their queen will die. After some months this young colony has increased and gradually builds tunnels out further and further until they show up on trees, posts or buildings. That is the only way in which white ants spread.

Any ants separated or prevented from making contact with the nest will die in a short time. If one takes a piece of wood badly infested with ants to a spot some distance from where it has been attacked and places it so that those ants on it cannot return to their nest, one will find in the course of a week or so that they have died and the dead ants will be seen still on or in the wood in clusters.

Since white ants return with food for their queen and for the young ants growing up in the nest about once every 24 hours, it is easily seen that the colony is dependent on the workers. If one destroys ants working at one particular spot, say, a spot in a floor, the ants that are coming from the nest will eventually find the limit of safety, close up the tunnel at that spot and work in a different direction by building a new tunnel, eventually showing up again because the colony has not been destroyed.

To effectively exterminate white ants from a building the whole building must be treated, not only to kill all the ants present, but also to guard against future attacks. It is common knowledge that no hive of bees will exist without a queen. This rule applies equally to white ants.

The only successful method of definitely exterminating white ants is to destroy the colony they are coming from, which may be quite a distance from where they are working. The simplest method of doing so is to disturb ants in their workings as little as possible, and give them a slow-acting poison, which they will carry home as food, and when fed to their queen and brood will poison them. This food, being in a powder form, will not lose its strength over long periods and will prove effective years after it has been applied. This method of treatment is the most effective in use to-day and has stood the test of over 20 years, not only in private contracts, but also in many Government buildings of various sizes, as records, particularly from the Victorian Public Works Department, will prove.

Farm Sidelines.

[A. Crabb (Taragoro).]

As sidelines, sheep and fowls go well together, or cows and pigs; or, if a farm is large enough, the four could be carried on.

Sheep.—Sheep should be kept in small paddocks of about 50 to 60 acres, and changed every fortnight so as to allow the feed to freshen. Each paddock should have about ½ acre of scrub for shelter. The sheep should be well looked after, and crutched twice a year. They should be shorn every 12 months at about the end of August. Breeding ewes should be hand fed on oats straight from the stripper during the dry period of the year, so as to give the ewes plenty of milk to rear the lambs. The breeding ewes should be kept away from the other sheep whilst lambing, so that better attention can be given them. If the lambs are dropped about the middle of April they can be marketed before the hot weather and before flies become troublesome.

Cows.—Cows should also be kept in small paddocks, and changed as often as possible. Cows are very fond of plants such as clovers, geranium, or lucerne. Cows should be shedded every night, and fed on crushed oats or bran with chaff night and morning, including plenty of salt in the feed.

Cows should be dried off at least six weeks before calving, and not milked until time for calving, as a spell does the cows good, and they are better when they come in again.

A pen for calves is preferable to tying them up, as they like plenty of exercise. They should be shifted into a small paddock as soon as possible. Shed, milk buckets, and everything attached to milking should be kept clean, as milk carries germs.

Pigs.—Choose the right type of pig, such as Large White, Tamworth, or Berkshire, as these are good for export pigs. A favourite pig for export is a Tamworth or Berkshire sow crossed with a Large White boar. Pigsties should be erected facing the east, with the west side enclosed with a shed, and closed on the north side so as to prevent the wind from blowing on the pigs. Pigsties should be partitioned into 4 pens, each pen leading to the east with a race along the front, so that one may change a pig to another sty without mixing the pigs together. There should be 2 small paddocks adjoining the sty sown with some kind of fodder in which the young pigs may run in the daytime. There should be a heap of straw in the middle of the paddock for shelter.

Pigs should be fed on either boiled, soaked, or crushed wheat or barley, with as much milk slops as one can manage to give them. If milk is scarce give Meggitts with milk or water. Pigs should have hay straw or heads to lie on. Young pigs should be taken from their mother at about 6 or 7 weeks old, and fed on milk food.

Fowls.—I believe in crossing fowls such as White Leghorn crossed with Black Orpington, or any light breed crossed with a heavy breed. The rooster from a light breed is no good for table use, and if they are crossed they are good for laying or table use. Fowls should be allowed to run free during the day, but should be shut up at night. They should be fed twice a day —on mashed bran and greenstuff chopped up with it in the morning, and wheat at night. They should be given plenty of shell grit. The sheds should be kept clean so as to prevent tick infestation.

Sidelines on the Farm.

[G. Haines (Brimpton Lake).]

When deciding on what sideline one is going to carry on there are several points to be considered. The first is what is best suited to our climate and conditions, and another is what will show the best percentage of profit on the outlay. At one time sheep were only kept as a sideline, but nowadays they are practically an essential on a farm, and are almost the chief source of revenue.

Dairy Cattle.—One has to keep one or two cows to supply milk and butter for household purposes, and there is very little more work attached to milking 4 or 5 cows, and they will bring in quite a handy income. On the majority of farms we will see the ordinary cow, with no particular breed at all, or probably showing signs of several different breeds. While admitting that one may strike very good cows among this class, it has been proved beyond doubt that the pure-bred animal is the most profitable. A good cow eats no more than a poor one, so one might just as well keep well-bred cows and get more profit out of the same amount of feed. Further, if you have pedigreed stock you can always command a better price for their progeny.

The best breed of cattle is the Friesian. They are much bigger beasts than the Jersey, and though not so rich in butterfat they are much more prolific in the milk supply. If put to a test over a certain period there would be very little difference in the total amount of butterfat from either breed, besides having the extra quantity of milk to feed to pigs. The Friesian, after serving its purpose as a milker can be fattened, and will bring a much better price as beef than any of the smaller breeds.

The two main factors with cows are to give them plenty of good feed, and free access to plenty of water, particularly in the summer time. Good cows are well worth handfeeding when paddock feed is scarce. Milking should be done as near to every 12 hours as possible, and should be carried out quickly and thoroughly. All milking utensils, separator, and cream cans must be kept thoroughly clean if one expects to get top price for the cream. A good idea, where it is possible, is to stand all utensils in the sun after they have been washed, thus freeing them from any germs which may have escaped the washing.

Sheep Dipping.

[E. H. Schirmer (Cambrai).]

As soon as the dipping season starts clean the pit and yards, and see that the fences are in good order. Fill the pit with water. In order to get the right quantity of water in the bath, it is necessary to measure or calculate the quantity of water required to fill to dipping level. A couple of hours before it is used put the powder in some tins or a drum and mix it with water to a paste. Then add it to the bath according to directions. The sheep should be yarded some hours before they are dipped—if possible the night before—so that they are not too full of feed. It is advisable to have a water trough in the yard so that they can drink, and will not be thirsty when they are dipped.

The Weather.—See that it is not too cold or looking like rain. If it is too hot, shade should be provided for the sheep soaked with dip in order to avoid scalding while they are drying off. There should always be enough time allowed for the last sheep dipped to dry before sunset. Therefore, if a big number is to be dipped in a day start as early as possible in the morning. The sheep should be in the bath for about 30 seconds, the head being quickly immersed twice with a plunger or crutch, allowing breathing time between immersions. The best time for dipping sheep is about 4 weeks after shearing. By that time all cuts are healed, and they also have a little growth of wool which is sufficient to hold the dip. While the dipping is in progress the dip should be thoroughly stirred occasionally to ensure all dip particles being in suspension in the liquid. When the bath becomes foul it should be cleaned out and refilled with a fresh lot of dip. If sheep are lousy or infested with tick before dipping, do not put the sheep back in the same paddock.

Activities of Women's Branches

NEW BRANCH AT MILANG.

The first meeting of the recently-formed Branch at Milang was held on 23rd October. Mrs. J. McCarthy presided over an attendance of 16 members, and read a paper, "Women's Branches of the Agricultural Bureau." (Secretary, Miss D. Whitfield.)

AUBURN.

Labour Saving Hints.

The October meeting was held at the residence of the Secretary (Miss L. Dennison), who read the following paper:—Tools for housework should be of good quality for the reason that muscles once worn out by unnecessarily hard labour entailed by inefficient tools cannot be replaced, while worn-out tools can. A food chopper is to be found amongst the equipment of most kitchens. Many people seem to regard it as a device for meat-mincing purposes only, and entirely disregard its many other labour-saving possibilities. Apart from the mincing of meat, with which everyone is familiar, the following are among the more unusual uses to which it can be put:—Parsley cutting, mint for mint sauce; suet can be passed through with a little flour more quickly than cutting with a knife; dried breadcrumbs put through the mincer produce fine even-sized crumbs, and save labour. Use the coarsest cutter for chopped apples for apple turnovers, also for chopping nuts; for making mincemeat pass the sultanas, currants, suet, peel, and apple through the machine, using the medium-sized cutter.

Broken clothes pegs have their uses; keep one in the boot box, it is much better than a knife to take mud off shoes. If porridge sticks to the bottom of the saucepan use a clothes peg to clean it off. If a window rattles with the wind keep a broken clothes peg handy to use as a wedge. Broken clothes pegs make good labels in seed boxes.

BELALIE.

Mrs. W. Bailey presided over an attendance of 23 members at the meeting held on 6th October. Final arrangements were made for the staging of the Bureau exhibit at the Jamestown Show. "Hints Regarding Sidelines on the Farm" was the subject of an address given by Mr. E. L. Orchard (District Agricultural Adviser.)

"This was one of the most enjoyable meetings we have held during this year" said the Secretary in reporting on the November meeting which was held at the homestead of Mrs. F. Cummings. The President congratulated the Branch on winning the first prize for the Bureau exhibit at the Jamestown Show. Mrs. H. Moore gave a report on the visit made by members of the Branch to a homestead meeting held at Clare. Congress delegates tendered their reports. Under the guidance of Mrs. Cummings members inspected the garden. (Secretary, Mrs. E. L. Orchard.)

BOOR'S PLAINS.

Mrs. N. J. Cross, the new President of the Branch, occupied the chair at the November meeting. With the President, Mrs. H. Queale gave a report of the Adelaide Congress. (Secretary, Miss L. Stanway.)

CLARE.

Dried Fruits.

With the approach of the dried fruits season, the following timely paper was read by Mrs. J. Fisk at the October meeting, at which 30 members were present:—"Australia produces annually dried vine fruits 75,000 tons and dried tree fruits 5,000 tons. Of these quantities, 15,000 tons are consumed locally, the remaining 65,000 tons being exported. This industry supports 30,000 Australians and gives work to another 20,000 during the harvesting period.

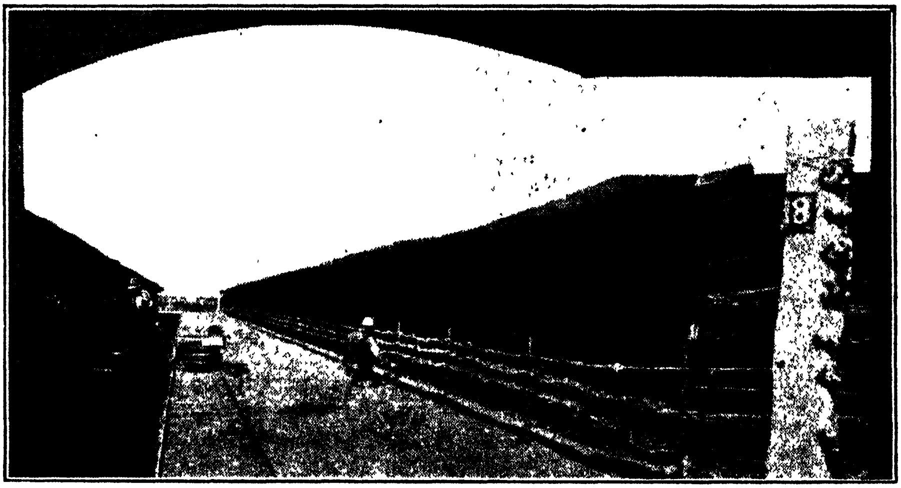
The annual production of dried fruits in South Australia is 24,000 tons, Victoria 48,000 tons, New South Wales 5,000 tons, and Western Australia 3,000 tons. Most of the South Australian fruit is grown on the River Murray settlements—Angaston, McLaren Vale, and Clare—and provides work for many hundreds of families. Among these are a large percentage of returned soldiers.

When the fruit is dried, only the non-essential moisture is removed by the sun's rays. All the excellent health-giving food value of the ripe fruit is retained in concentrated form in the dried fruit which contains 75 per cent. of carbo-hydrates, the heating or energy-producing element in food, and are therefore particularly good for growing children.

Dried fruits are economical—1lb. of dried vine fruits equals 4lbs. of fresh grapes; 1lb. of dried tree fruit equals 6lbs. of fresh ripe tree fruit.

Useful Hints.

Chopped raisins and horse radish make a splendid relish to serve with meat. Put a few raisins in the children's breakfast food, they will like it better and get added nutrition. Add raisins to every-day puddings for children, for added flavour and nutrition. Raisin bread is delicious for breakfast or tea. Lexias or sultanas added to curry, chutney, and pickles enhance the flavour to a marked degree. Baked apples stuffed with raisins and brown sugar served with cream, are unequalled for their flavour. Equal amounts of chopped raisins and nuts moistened with orange or lemon juice make a delicious and nutritious sandwich filling.



Recipes.

Dried Apricot Jam.—Wash 1lb. of dried apricots thoroughly, soak in 4 pints of cold water for 24 hours, put on to boil and boil 30 minutes, then add 4lbs. of sugar (warmed in the oven), and 1oz. of blanched almonds. Boil for another 30 minutes, or until a little put on a cold saucer seems sufficiently set.

Stewing Dried Fruit.—Soak in cold water for 12 hours, place in a pan with enough water to cover, and simmer slowly for 20 minutes, add sugar for the last 5 minutes only, so that the syrup does not become too thick.

With all dried fruits care should be taken to avoid over-cooking, which causes the flesh to leave the fibre. The object is to restore the appearance and flavour of the ripe fruit.

To Dry Currants.—Place the cut bunches on trays in a semi-shaded position, turn each day for 5 or 6 days, when the currants will be ready.

To Dry Sultanas and Lexias.—Bring water to boil and add 1oz. of caustic soda and 1 teaspoon of olive oil to each gallon of water. To dip the bunches in the lye, use a colander with a handle fixed thereto and immerse for 5 seconds. To test the lye, place a grape on a stick, dip in, and if the grape is slightly cracked, the lye is right.

Lemon and Orange Peel.—Put a good sprinkling of sugar at the bottom of the jar, then peel (cut finely), sugar and peel in rotation until jar is filled. The cost is only for sugar, as usually the peel is thrown away.

Grape Vinegar.—To every 1½lbs. of grapes, bruised or crushed with a wooden spoon, add 1gall. of water previously boiled and allowed to get cold. Allow all to stand in an earthenware vessel in a cool place for 5 days, stirring twice every day. Then strain and add 1lb. of sugar to every gallon and allow to stand with only a light covering to keep out dust. At the end of 6 months, strain and bottle. A bread crock can be used if a large quantity is required.

Dried Fruit Recipes Supplied by Members.

Take any dried fruit, apricots, peaches, nectarines, &c., soak them and then put raisins, currants, sultanas, with sugar, boil them and cool. Make pastry—2 cups S.R. flour, ¼lb. butter, 1 tablespoon sugar, 1 egg, little milk, mix—roll out very thin (this is rather short and will be hard to roll), then put fruit between layers. Cut in squares after cooked, and sprinkle with sugar.

Prune Cake.—1 cup boiled and cut up prunes, 1 cup sugar, ½ cup butter, 2 tablespoons cocoa, 1 teaspoon cinnamon, ¼ teaspoon nutmeg, 2 eggs beaten separately, whites from yolks, ½ cup water in which prunes were boiled with 1 teaspoon soda in same, 1¼ cups flour, add white of eggs (well beaten) last of all, bake ¾ hour.

Prune Bars.—¼lb. butter, ¾ cup sugar, 3 eggs, 1½ cups flour, ¼ cup milk, ½ cup chopped walnuts, 1 cup chopped prunes, 2 heaped tablespoons cocoa, 1½ teaspoons baking powder. Beat butter and sugar to cream, add eggs one at a time, add flour and cocoa, mix well with milk, then add nuts, prunes, and lastly baking powder. Put mixture into a Swiss roll tin, bake in a moderate oven for 20 minutes. When cooked ice with a thin layer of chocolate icing and cut into narrow bars. (Secretary, Mrs. A. Pollock.)

ECHUNGA.

Cooking Competition and Needlework Display.

The Secretary (Mrs. E. J. Dennis) reports that the Exhibition of Needlework and Cooking held under the auspices of this Branch on 9th November has done much to bring the Agricultural Bureau prominently before the womenfolk of this district. The competition created a great deal of interest and was attended by 22 members and a large number of visitors. Mrs. B. Milligan judged the cooking entries and made the following awards:—Blow sponge: 1st, Mrs. W. Garrett, 2nd, Mrs. G. Edwards; sponge sandwich: 1st, Mrs. Porteous, 2nd, Mrs. E. Dennis; lamingtons: 1st, Miss V. Liebelt; sultana cake: 1st, Mrs. F. Wickham; coffee cake: Mrs. Feder; fruit cake: 1st, Mrs. G. Edwards; buttermilk cake: 2nd, Mrs. Gilbert; scones: 1st, Mrs. Gilbert; small cakes: 1st, Mrs. F. Walters, 2nd, Miss W. Perry; macaroons: 1st, Mrs. F. Walters; cream puffs: 1st, Mrs. McDonald, 2nd, Mrs. Gilbert. Needlework for the exhibition was loaned by Mesdames Hall, Perry, Liebelt, Smith, Radford, Feder, Walters, Edmonds, Gilbert, Berry, and Misses Liebelt and Dennis.

A combined meeting of the Men's and Women's Branches was held during October at Mrs. McDonald's homestead, who read a paper, "The Care of Poultry," and gave members the opportunity of inspecting the methods adopted for the housing of the birds.

GEORGETOWN.

Interesting reports of the proceedings of the Adelaide Congress were given by the Branch's delegates. Twenty-one members and 4 visitors were present. (Secretary, Miss J. Crawford.)

GLADSTONE.

In the absence of the President, Mrs. Spottswood presided at the October meeting which was dvoted to hearing the reports of the members who represented the Branch at the Annual Congress. (Secretary, Mrs. L. J. Sargent.)

HOPE FOREST AND DINGABLEDINGA.

Seventeen members attended the annual meeting which was held at the residence of Mrs. Jefferis on 5th November. Mrs. Jefferis spoke on the activities of rural women and read extracts from the proceedings of the World's Conference of Country Women held in America. (Secretary, Miss M. DeCaux.)

KARTE.

Members held the October meeting at the residence of Mrs. H. Trowbridge, when reports of the delegates to the Annual Congress were received and discussed.

Ten members attended the meeting held on 4th November at the homestead of Mrs. A. Gum. Mrs. F. N. Atze (Secretary) gave a paper, "Dahlia Growing."

LAURA BAY.

The business of the 13th October meeting, which was held at the residence of Mrs. W. Bowell, was devoted to hearing the reports of the Congress delegates and to a discussion on next year's Ceduna Conference. (Secretary, Miss R. Blumson.)

McLAREN FLAT.

The meeting on 5th November was held in the Soldiers' Memorial Hall and was attended by 19 members and visitors. Business of the meeting was devoted to making arrangements for the local Centenary celebrations. (Secretary, Miss F. Bell.)

MILLICENT.

After the report of the delegates to the Annual Congress had been received and discussed, the meeting held on 15th October took the form of a social afternoon. (Secretary, Niss K. Hutchesson.)

MUDAMUCKLA.

Mrs. Noske presided at the November meeting which was held at her residence. Comprehensive reports of the proceedings of the Annual Congress were given by the delegates—Mesdames Flaherty and Watson. The Branch will go into recess until February.

MONARTO SOUTH.

Nineteen members and 10 visitors were present at the meeting held on 19th September. Mrs. T. Bretag and Miss T. Aesche reported on the Adelaide Congress.

At the October meeting Miss F. Lehmann spoke on a trip she had recently taken to New Zealand. (Secretary, Mrs. F. Liebelt.)

MORCHARD.

A Flower Show was held on the afternoon of 24th November. Mrs. J. McDougall, of Orroroo, judged the exhibits, and made the following awards:—Bowl of Mixed Flowers—1st, Mrs. W. Twigden; 2nd, Miss J. Irvine. Evening Spray—1st, Miss S. Twigden; 2nd, Miss F. Brown. Wreath—1st, Mrs. C. Koch; 2nd, Miss J. Irvine. Bouquet—1st, Miss S. Twigden; 2nd, Miss M. Koch. Table Decoration—1st, Mrs. W. Twigden; 2nd, Miss Q. Halliday. (Secretary, Miss F. Brown.)

NARRIDY.

Twenty-five members were present at the October meeting to receive reports on the Adelaide Congress, which were given by Misses Roberts and Mannix.

At the September meeting an audience of 34 members and a large number of visitors listened with interest to an address, illustrated with lantern slides, given by Mr. and Mrs. J. Eagle on a trip around the world. A moving picture, depicting various phases of the shipping industry, was shown by Mr. J. Klingner. (Secretary, Miss B. Reynolds.)

NELSHABY.

The monthly meeting was held on 29th October, and was attended by 13 members. A detailed report of the Annual Congress was presented by Mesdames Jose and Noll. (Secretary, Miss A. Laurie.)

OWEN.

The report of the delegate to the Annual Congress (Mrs. H. Helps) was the subject of the meeting held on 15th October, which was attended by 11 members. The Secretary (Miss M. Lake) read a paper from the *Journal*, "Soaps and Cleansers."

PARRAKIE.

Old Clothes and Their Uses.

The following paper was read by Mrs. A. Sanderson at the meeting held at Mrs. Cabot's homestead on 14th October, which was attended by 17 members:—There are clothes that are quite wearable and have become either shabby or too small. There are those that are beyond making into garments. From the wearable cast-offs mothers can make many attractive garments, which are needed to dress a family of boys and girls.

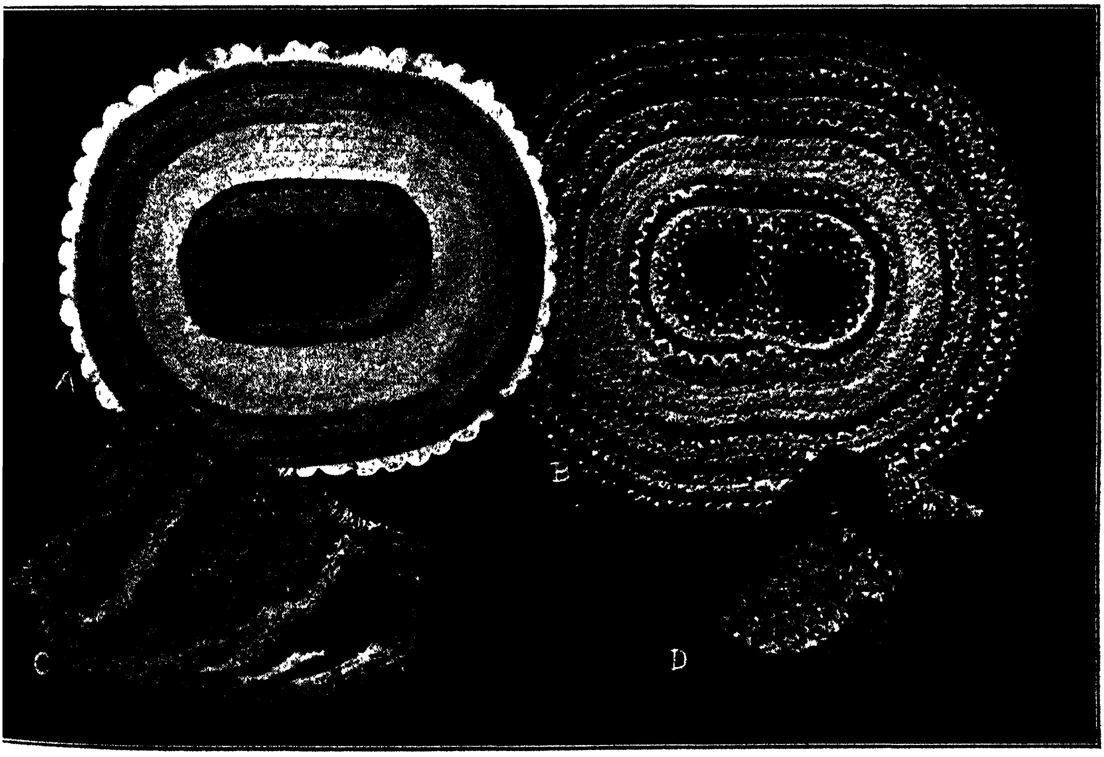
What can be made for a small boy? There are often the ends of shirts and other strong parts which can be made into a nice shirt or jumper. The same applies to trousers. The back part is usually good, and from this and other portions which may be strong one can cut a nice pair of trousers. From cast-off pullovers and cardigans there is always the possibility of making a smaller one out of the best parts. Ties once they are too shabby come in handy for the schoolboy by cutting off some of the narrow ends and making them much shorter. The best part of underpants and pyjamas can be used for linings of trousers or making singlets.

An overcoat which is shabby and threadbare in places can, by being taken to pieces and turned on the wrong side, be made into a winter coat. The same applies to a little girl for a coat.

For dresses for girls there is generally some way to cut them out of discarded garments, but always make sure of getting the strongest portion of the garment, which will show plainly by holding the material up to the light. Singlets can always be cut from those that have been worn by an adult, using the bottoms and cutting to shape. Crochet around the neck and sleeves with a silk thread. Pinafores can be made from the ends of men's shirts—a pattern with a yolk and two straight pieces gathered in always looks tidy. Woolly or fleecy-lined underwear can be turned into bloomers or petticoats. Even some ladies' hats can be undone, and made smaller to fit girls. Gloves can be made to keep the fingers warm by using old woollen stockings. Cut them the old-fashioned way of one finger and the other four in one.

There never need be one single cast-off garment destroyed. Besides having some in a bag for use as dusters, &c., there are always ways of using up old clothes—making rugs for beds, mats for the floors and, by cutting up into small pieces, fillings for mattresses, pillows, and cushions. A warm rug can be made from old trousers by dividing them in two and placing them together alternately to make the sides square, and covering with cretonne of a shade that does not show the dirt too easily. Even old worn woollens stitched together make a very warm cover. Never waste a button or fastener, always take them off, and these will be useful when there are buttons to replace on mending day.

Floor Coverings.—Old clothes can be used to make carpets for the floor. For the hooked rug always use all woollen materials together or all silks, otherwise after a while one part of the rug will wear out before the other. Another way is to cut strips 5in. long and 1in. wide, sew three

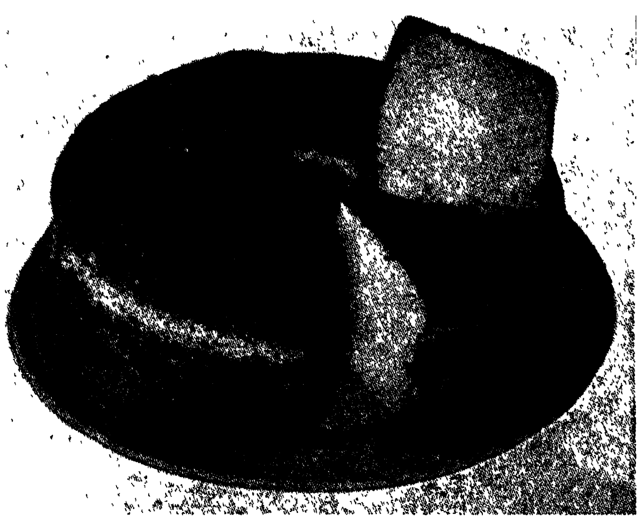


thicknesses of these together on sugar or bran bag, in rows as close as possible, blending the colors together. When making mats one can always dye the clothes in preparation for the work. Another way is to use all old felt hats by cutting them into 2in. squares and top-sewing them together, arranging the colours to suit, and iron with a damp cloth on top-sewing side to flatten down the squares, and finish off with a fringe of thick wool. Old marocain or crepe-de-chine frocks make nice mats for the floor by cutting them in ½in. strips and double crochet around and around. The same applies to old stockings. Felt slippers, cosy for children, can be made from old felt hats. Mrs. Sanderson exhibited samples of her handiwork. (Secretary, Miss J. Halliday.)

PENOLA.

Cakes for Shearing Lunches.

As most of the farmers in the district are in the middle of shearing, the meeting held on 4th November, which was attended by 20 members, was devoted to recipes for cakes for lunches for shearers. The following recipes were supplied:—



Buttermilk Loaf.—2½cups flour, 1 cup each sugar and fruit, 1 tbspn. butter, 1 tspn. each c. soda, cinnamon and spice, and 1 egg. Mix with 1 large cup buttermilk. Bake in a moderate oven for 1 hour.

Johnny Cakes.—½ cup each butter and dripping, 1½ cups sugar, 4 cups flour, 1 tsp. c. soda, 2 tspns. c. tartar, 1 egg, and currants. Rub butter and dripping into flour, add sugar, egg and sufficient milk to mix.

Drop Cakes.—1 cup dripping, 2 eggs, sugar, 3 eggs, 3½ cups flour, 2 tspns. c. tartar, 1 tspn. c. soda, essence of lemon and milk to mix. Place cocoanut in one half and fruit in the other. Drop on a greased slide.

Dark Jam Cake.—¼lb. butter, 1 cup sugar, 1 egg, beat well together, 2 tbspns. dark plum jam, 2 tspns. mixed spice, 1 cup milk, 1 tspn. c. soda, 2 cups flour, fruit if desired.

Myra Cake.—½lb. each butter and sugar, 4 eggs, ¾lb. S.R. flour, 1 tbspn. marmalade, ½ cup milk, currants and lemon peel. Bake in gem irons.

Cup Cake.—1 cup each butter and milk, 2 cups sugar, 3 eggs, 3 cups flour, 1 tspn. c. soda, 2 tbspns. c. tartar, 1 tbspn. golden syrup, 1 cup currants. Cream butter and sugar, &c.

After the reports of the delegates who had attended the Annual Congress had been received and discussed at the meeting held on 7th October, a Scone Making Competition was held. Eighteen entries were received and Mrs. T. Oswald was awarded first prize. Thirty members attended. (Secretary, Mrs. Edith Kidman.)

PINNAROO.

Home Made Sweets.

Twenty members and two visitors accepted the invitation of Mrs. A. F. Young to hold the December meeting at her homestead. The following paper was read by Mrs. A. Hawthorne:—The average person with a liking for cooking can, with patience and practice, make quite a creditable show of lollies in the ordinary kitchen. Many sweetmakers become discouraged owing to failures, chiefly on account of burning, or the confectionery not setting, or going back to sugar again. The failures are due mostly to inaccurate recipes. Making sweets needs very careful attention. Care must be taken with the stove. See that the heat is even; too much heat scorches the syrup before the required degrees is registered.

The secret of successful sweetmaking is in the proper use of the thermometer. It must be slightly warmed before placing in the hot syrup. Never wash the thermometer in cold water. Do not allow the syrup to boil until all the sugar is dissolved. Never stir the syrup after it starts to boil, but have a clean brush dipped in cold water and keep the syrup brushed down the side of the saucepan, taking care not to let the brush touch the syrup. When the syrup starts to boil it must be kept boiling quickly. Boiling too slowly causes granulation. Only stir the boiling syrup when specially directed to do so. As soon as the correct degree is reached, remove the saucepan from the fire. Always watch the thermometer and never allow it to go over the given degree.

Care must be taken in using colourings and flavourings; see that they match. Always remember that the colour is deeper when the sweets are cold. Light shades are much better than bright ones. The most important ingredient in sweetmaking is sugar, and there is also a lot of maize syrup used, but this is rather difficult to obtain and is also expensive. Cream of tartar is used as a substitute—one teaspoon of cream of tartar is equal to 12ozs. of maize syrup. When using maize syrup dip the hand in cold water, then take out with hand the quantity of maize syrup required; this prevents it sticking to the hands. Weigh the quantity of sugar first, then weigh maize syrup on top of sugar to prevent it sticking to the scales. Fondant made of sugar and cream of tartar produces a firm and very smooth cream, and a good variety of sweets can be made from it . Raisin, date, cherry, prune, walnut, and chocolate creams can be made.

PLAIN FONDANT.

Three-quarters of a pound of sugar, 2ozs. maize syrup, or a pinch of cream of tartar (not both together), and damp with about half cup water. Place on fire and stir well until dissolved. Place lid on saucepan for one minute to steam any sugar off the sides. Insert thermometer and boil to 240°. Remove from fire and pour syrup on to a large meat plate. When lukewarm, beat up well with a butter pat. As soon as it forms a solid lump, cover with a damp cloth and leave from half to one hour; then knead in the mixture with the hands until free from lumps.

PLAIN TOFFEE.

Three pounds sugar, ¾lb. maize syrup. Moisten the sugar and syrup with water. Put on fire; do not stir after the maize syrup is dissolved. When 315° pour out into a greased tin. Add almonds, peanuts, or flaked cocoanut.

SNOWBALLS.

Soak 1oz. gelatine (sheet) in 1½ gills of water 20 minutes. Boil together 1lb. sugar and 1 gill water; boil until sugar is dissolved. Add gelatine and water, boil 10 minutes longer, turn into a large bowl. Beat until cool and stiff. Put mixture into egg cups, small glasses, or gem scone trays to set (dust them with cornflour before putting in the mixture. Turn out, dip into chocolate coating and roll in cocoanut.

CHOCOLATE RUFFS.

Chop milk chocolate up in a basin, stand in dish of warm water, stir until melted and add browned cocoanut until thick enough to put out on grease-proof paper with two forks. Make peanut, walnut and almond clusters the same way and use sweet chocolate. (Secretary, Mrs. L. Worth.)

RENDELSHAM.

In the presence of a record attendance, 14 members and 80 visitors, Miss I. Campbell gave an address on the Centenary Flower Show. (Secretary, Mrs. Z. Bignell.)

SHEOAK LOG.

Twenty-nine members attended the meeting held on 10th October. Mesdames Bowden and Koch, who represented the Branch at the Annual Congress, gave reports of the various sessions.

An attendance of 35 members at the meeting held on 12th November will assist in keeping up the high average attendances recorded by this Branch. Mr. Dunks, of Gawler, gave an interesting address on "Bread and Cake Making." (Secretary, Miss K. Koch.)

TANTANOOLA.

Preserving Fruit for Home Use.

The September meeting was held on the 22nd of the month. Thirteen members were present and Mrs. H. Edgecumbe read the following paper:—"There are various methods of preserving, the two simplest being with the vacuum, using the Fowler outfit, or the open pan system. Those who have not a Fowler outfit can do quite well with a preserving pan or the ordinary washing copper, a kerosene tin cut off or any vessel large and deep enough for the purpose.

Place in the bottom a piece of wire gauze or a few slats of thin, narrow wood nailed together, or anything suitable to enable the water to circulate underneath the jars. Prepare the fruit which should be of that quality which could be classed as first grade. It should be of good colour, with a firmness of flesh and free from blemishes. It should not be over ripe, because it requires to be sufficiently firm to stand the application of heat to which it is subjected and still retain its natural shape. Wipe the fruit free from dust and pack regularly and neatly into the containers. The syrup may be of any desired strength and may be varied according to taste for most fruits. A syrup suitable, and the one mostly used, is made by adding two cups of boiling water to one cup of sugar. Strain through a piece of muslin and pour over the fruit cold, making sure the bottles are quite full. If using Mason jars, place on the rubbers, screw the lids on lightly or the jars may burst, place them in the pan or steriliser (they can be done the same time as the Fowler bottles), and fill with water three parts of the way up the bottles. Heat to 180°, or if a thermometer is not available, simmer gently until fruit is cooked—about half an hour." (Secretary, Mrs. G. Altschwager.)

WARRAMBOO.

Members combined with those of the Men's Branch to hold a social evening on 30th October. Reports of the Minnipa Conference were received. The Branch will go into recess until February. (Secretary, Mrs. A. Steer.)

HOMESTEAD MEETING AT WIRRABARA.

Four new members were enrolled at the October meeting, which was attended by 38 members and 8 visitors. The meeting was held at the residence of Mrs. C. Curnow. A most enjoyable afternoon was spent inspecting the collection of native birds and animals. A striking feature of the garden was the rockery and succulent plants. Surprise was expressed that Mrs. Curnow was able to find so much time to devote to her hobbies in addition to the routine work of the farm homestead. (Secretary, Mrs. I. J. Harding.)

YANDIAH.

Twelve members were present at the meeting held on 9th October to receive reports on the Adelaide Congress which were given by Mrs. A. Kupke. (Secretary, Miss O. Keller).

Fodder Conservation.

In a paper on the above Mr. C. Jericho (Balumbah) stated that hay was the main fodder which farmers were able to store, but where it was not possible to store hay it might be possible to resort to the storing of feed oats, wheaten chaff, or even straw, any of which would help in a pinch. Haystacks should be built wide, in order that the hay would not slide sideways, and should be mouse-proof. Covering the stack with straw would help to prevent damage from rain. Oats stored direct from the stripper formed another type of fodder. They could be fed alone or could be mixed with chaff if they contained too high a proportion of grain. Oats reaped with the harvester or cleaned with the winnower, and which were too dirty for seed purposes, could be used in the same way. Cocky chaff was a cheap fodder. Heaps of cocky chaff left in the paddock and covered with straw would generally be scattered by foxes looking for mice, or heavy rains would cause it to become mouldy. Stored in a shed, however, cocky chaff was a useful stand-by when mixed with oats, bran, or pollard. Strawstacks were appreciated by cattle. They should be made with oat or barley straw and a little salt. The eaves should be just above the reach of the animals, and fairly wide. Ensilage was a fodder which could be stored, and would remain good for a very long time.

JOURNAL

OF THE

Department of Agriculture

OF

South Australia

VOL. XL. JANUARY, 1937. No. 6

Published Monthly by the Department of Agriculture Edited by H. C. PRITCHARD

Page

Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836-1936 477-486
Free-Water Investigations in the South Australian Areas of the Murray Valley 487-496
Celery Growing 497-501
Herd Testing 502-505
Cereal and Manurial Experiments in South Australia 505-509
Cream Grading and Cream Quality 510-512
Feeding Tests at Parafield Poultry Station 514
Egg-Laying Competitions 515-516
Seed Wheat from Crop Competitions, 1936-37 517-518
Results of Wheat Crop Competitions, 1935-36 518-520
Advisory Board 521
Rainfall Table 522-523
Bureau Reports 524-532

WOMEN'S BRANCHES.

Bureau Reports 532-546

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1937

- River Murray (Swamps), at Wood's Point, Thursday, 18th February (Mr. F. P. Baily).
- Lower North, at Wasleys, Thursday, 25th February (Mr. Elliot Day).
- Mid-North, at Koolunga, Thursday, 11th March (Mr. J. W. Sykes, Koolunga).
- South-East (Upper), at Bordertown, Wednesday, 17th March (Mr. L. H. Butler).
- Yorke Peninsula, at Stansbury, Wednesday, 24th March (Mr. H. W. Cornish).
- South-East (Lower), at Coonawarra, Wednesday, 14th April (Mr. John M. Kain).
- Dairying, at Lobethal, Thursday, 13th May (Mr. B. Schapel).
- River Murray, at Waikerie, Thursday, 17th June (Mr. F. B. Harden).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

	London Values.					
Date of Quotation	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Vancouver	Argentine Wheat.	Karachi Choice White Wheat.	
1936.	Dec.	Jan.	Dec.-Jan.	Jan.-Feb.	Dec.-Jan.	
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*London Sales.*
Dec. 10..	5 6¾	5 6	5 5¼	5 0½	5 3¾	For Italy, Victorian parcel 7,500 tons (Dec.) 5s. 6d., S. Aus. parcel 7,928 tons (Feb.) 5s. 6d., W. Aus. parcel 7,200 tons (Dec.) 5s. 6⅜d., Plate three cargoes and 10,000 tons Danubian. For Shanghai, Plate one cargo. Other London sales—S. Aus. 7,200 tons (Jan.) 5s. 5⅜d. and 3,000 tons (Feb.) 5s. 5¼d.; N.S.W. 8,250 tons (Dec.) 5s. 6d.; Victoria 500 tons bagged (Dec.) 5s. 6d.; W. Aus. 8,000 tons (Jan.) resold 5s. 5⅝d. and 1,000 tons bagged (Jan.-Feb.) 5s. 6d.
					June-July	
Dec. 15..	5 10½	5 10⅛	5 8⅝	5 4⅛	5 6	Four cargoes plate wheat sold to Italy; N.S.W. parcel 3,400 tons (March) 5s. 8¼d.
Dec. 23..	5 7½	5 7⅛	5 8⅞	5 3¼	5 3¾	N.S.W. parcel 7,500 tons (Feb.) 5s. 6d.
Dec. 30..	5 8⅝	5 8¼	5 11⅝	5 5½	5 5¼	
1937.	Jan.					
Jan. 7..	5 9	5 9	5 11⅞	5 4⅞	5 4⅞	N.S.W. parcel 7,200 tons (Jan.) 5s. 7⅛d. and parcel 7,500 tons (Jan.) 5s. 7½d. W. Aus. parcel 6,400 tons (Jan.) 5s. 7⅞d.
			Jan.-Feb.			
Jan. 14..	5 8⅝	5 7½	6 0	5 4⅞	5 4½	12,000 tons Czecho-Slovakian and one cargo Roumanian reported sold to Italy, also 10,000 tons Plate to Germany; N.S.W. parcel 9,300 tons (Feb.) 5s. 6d.; W. Aus. parcel 7,500 tons (Feb.) 5s. 6¼d.

THE JOURNAL

OF THE

Department of Agriculture

OF

South Australia.

Vol. XL. JANUARY, 1937. No. 6

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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By ARTHUR J. PERKINS, Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 403, *December*, 1936, *issue.*)

THE FIRST DECADE, 1836-1846.

CHAPTER II.

Sale of Town Acres—"Delayed Country Surveys"—Light's Explanation—Alleged responsibility of Commissioners for delays—Exaggerated influence ascribed to delayed surveys—Some advantages of delayed surveys—Farming handicaps of Pioneer Emigrant Farmers—Victims of delayed country surveys—John Barton Hack.

The Imperial Parliament in its wisdom had decreed that not until £35,000 had been received by the Colonisation Commissioners from sales of land effected in the United Kingdom should any official steps be taken towards the foundation of the new Colony: and in order to stimulate such sales, the Commissioners, in their pressing need, had conceded in their Regulations that in the matter of both town acres and country sections, the first 437 purchasers of land orders in the United Kingdom should have priority of choice *as far as was possible throughout the Colony.* Nor did the rashness of such concession become apparent until in due course the colonists were apprised that a sufficient area of country land had been surveyed from which they could make their selections. But obviously no difficulty could arise when on the 23rd March, 1837, the 437 preliminary purchasers took their choice of the one thousand acre town allotments: nor when the residual balance—563 acres—was sold at public auction a few days later, realising an average price of six guineas per acre.

The survey and sale of town allotments once safely out of the way, one would have imagined that the full energies of the surveyors would soon have been centred upon those country lands, towards which for some time past the anxious gaze of expectant would-be settlers had been strained. But such unfortunately was not to be the case: and let the tale be told in Colonel Light's own words:

"It was natural to expect that on completion of the town, the survey of the country sections would commence; but by this time our survey labourers had become a different set, the constant taunts and jeerings of the new comers, who would not work, soon produced an effect on them also, and they gladly availed themselves of the least defalcations in rations to strike work. This misfortune became daily of more consequence, as the increase in settlers took place. The demand for every kind of carriage became greater, and even our small survey trucks were often used for transporting luggage from Holdfast Bay. . . . . The survey labourers were several days either wanting rum, biscuits, beef, pork, tea, sugar, flour, &c., and these were excuses for knocking off work. The men who had at first worked without murmuring were now changed by the jeers I before alluded to: they were called by many of the new comers the 2s.-a-day slaves: and if one day a party were formed to commence the survey, the next was sure to begin by the absence of nearly all of them. Their complaints had much truth: they had signed articles in England for 12s. a week and rations, the same in quantity as allowed in H.M. Navy, and they were sometimes many days with hardly anything but biscuits: sometimes not that. Had there been no difficulty with the men, we could not have detached a party from the town, *as not a single bullock could be had.* The tents were all in use by the emigrants as well as by the surveying party. The rations that came up from Holdfast Bay in small quantities were delivered almost immediately, not only to those entitled to them by agreement, but also to the emigrants, who had no other means of subsisting than from the Commissioner's stores: and the remaining part of the 12 months' stores purchased in England for the use of the survey alone were now shared out to all. Humanity required this: but the consequence was a cessation of work, and an apparent neglect of duty on the part of the Surveyor-General, for which, of course, there were many quite ready to abuse him."(1)

If we were to accept the correctness of the recollections of Colonel George Palmer—a member of the Board of Colonisation Commissioners—as set out by him on the 12th April, 1841, in a letter to G. F. Angas, we should probably recognise that in addition to the difficulties outlined by Light in his personal statement, he had to grapple with financial ones as well, "shortly after he commenced operations on shore at Kangaroo Island. He induced his men to continue their duties by receiving payments from time to time in Notes of hand of his own, after all the ready money belonging to himself . . . had been advanced by him for that purpose, and he completed the survey of the town of Adelaide by his credit with the Banking Company."(2) If such were his plight, then by that time Light must have exhausted the beggarly £100 in specie thoughtfully provided by the Colonisation Commissioners "for the purchase of stores after his arrival in Australia"(3) together with the batch of printed orders on the storekeeper which had been similarly provided, and a facsimile of one of which has been shown on the next page. Colonel Palmer went on to state that when Light approached the Resident Commissioner—J. H. Fisher—with a request for additional funds, the latter regretted that he had none available for such a purpose; but suggested that Light should take over some pickled pork which had been sent out by the Commissioners, who had stipulated that the pork should be sold at a profit of 20 per cent. above invoice value. The pork was subsequently accepted by the representatives of the South Australian Company in satisfaction of Light's notes of hand which they held, and they agreed to provide him with an additional credit of £500. It was understood that the Company would retail the pork to its whalers and to 400 German emigrants who were daily expected from Bremen.

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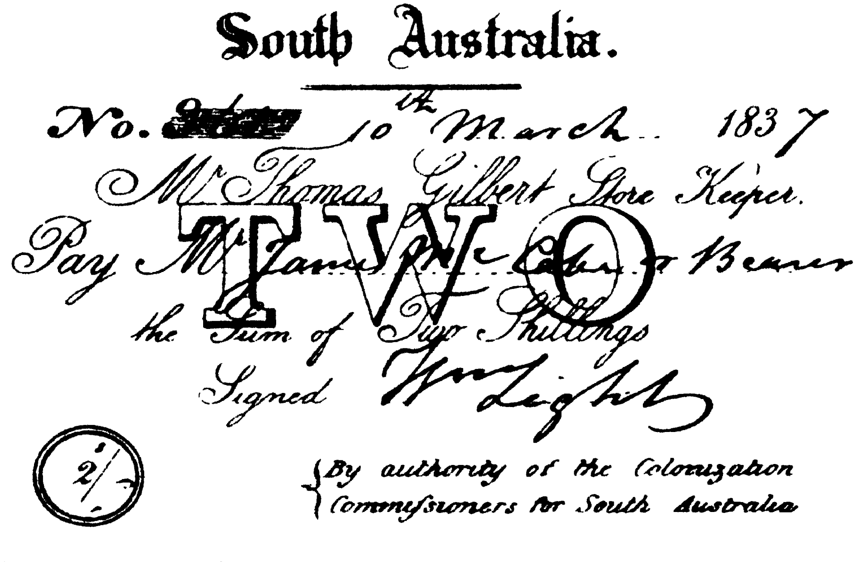
(1) Colonel Light's Journal.

(2) Letter of Colonel George Palmer to G. F. Angas.

(3) A brief sketch of the coinage and paper currency of South Australia by Thomas Gill, I.S.O.



South Australia.

No. [redacted] 10th March 1837

Mr Thomas Gilbert Store Keeper.

Pay Mr James Mc [illegible] or Bearer

the Sum of Two Shillings

Signed Wm Light

TWO

2/-

By authority of the Colonization
Commissioners for South Australia

Facsimile of Original Order

We seem to be confronted here with a picture of complete disorganisation at the very outset of a campaign, which was intended speedily to bring into being a new centre of civilisation at the Antipodes: a disorganisation fraught with serious consequences for many a small farmer who had emigrated from the British Isles in the simple faith that he would start building up his new farm so soon as he had set foot on Australian shores: such indeed was the burden of the complaint of many, who to their dismay had found themselves reduced from small capitalists to the ranks of casual labour, namely, that definite promises of early land settlement had been made to them in the United Kingdom by accredited agents of the Colonisation Commissioners.(4) The apportionment of blame for this regrettable state of affairs has been assiduously investigated by others, and notably by Dr. A. G. Price,(5) and according to the latter the chief culprits would seem to have been the Colonisation Commissioners, who grievously underestimated the magnitude and the difficulties of the task assigned to Colonel Light; and who sent the latter out on this task ill-staffed, ill-equipped—except in the matter of regulations—and inadequately supplied with funds: but, as it appears to me, over and above the Commissioners and all other culprits towered the baneful Act of the Imperial Parliament which indeed "erected" South Australia into a British Province—

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(4) The *South Australan Regıster*, 3rd June, 1837, page 4, col. 1.

(5) *The Foundation and Settlement of South Australia*, by A. G. Price, 1924.

in words: but which perversely obstructed all attempts to give satisfactory effect to its own provisions, and stood athwart the road to progress until definitely repealed in 1842.

Nevertheless Colonel William Light himself, distinguished, talented, single-minded, lovable man that he was, cannot wholly escape some share of the blame: if, that is to say, a man could fitly be blamed for native temperament or for burden of rapidly declining health. Temperamentally, he was undoubtely the "artist" in love with his work, and to the extent that his powers went, incapable of ill-doing any portion of it: and he could probably inspire corresponding sentiments in some of his associates: but it did not follow that like an efficient captain of industry, he could compel results from those who neither could nor would respond to his personal charm. Doubtless too his hyper-sensitiveness to querulous criticism—the justice of some of which he would probably have admitted—coupled with failing health, must have weakened what driving powers he might have commanded in happier days. In other words, notwithstanding admitted difficulties and obstacles, had Light been other temperamentally, had he been in the full vigor of health, more would have been achieved within the same period of time than Light and his associates actually succeeded in achieving.

It is however very much open to question whether some writers have not over-stressed "delay in country surveys" as chief causal factor of the disasters which a few years later came nigh to overwhelming the youthful community. Might it not be that concentration upon the blistering misfortunes of South Australians had had the effect of obscuring others, who were equal if not greater sufferers in those calamitous years? In the months of February and March, 1842, to take a solitary example, in Sydney alone there were 52 insolvencies for amounts exceeding £1,000, besides many other minor ones: ([6]) nor were the financial positions of Van Diemen's Land, Swan River, and New Zealand any better than those of Sydney or South Australia. And so bad did conditions at the Cape of Good Hope loom in Australian eyes that a section of the press of bankrupt New Holland insistently besought its readers to have no traffic with bankrupt Cape Colony. And both Europe and America were in the throes of economic depression. In the circumstances, since we cannot assume that all these countries were contemporaneously suffering from the after-effects of "delayed country surveys," we must fall back upon a more likely cause, namely, that as in the early thirties of the present century, so in the early forties of the immediately preceding one, certain world factors were at work, which eventually led to world-wide economic depression, general loss of confidence and disastrously low prices for all objects of world commerce, but particularly so for Colonial products. It is hardly within our province to particularise what these "factors" were: but I imagine that we might safely conclude that "delayed country surveys" was not one of them; and that however much such purely local factors might and did influence the fortunes and lives of a limited number of individuals eking out their lives in a corner of New Holland, they can have had but little influence upon the trend of the economic cataclysm which befell not only New Holland, but the wide world as well.

Moreover there have been those who have argued with a fair show of reason, that on the whole and from the general community standpoint, the disadvantages of the "delayed country surveys" were out-weighed by counterbalancing advantages: and upon purely technical grounds I am inclined personally to agree. In this connection we should try and picture the equivocal position of these bold adventurers, who from a far distant homeland had come

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([6]) *Sydney Herald*, 31st March, 1842.

out to exploit the Australian wilderness: and apart from a few calculating leaders, it was farming, gardening, the handling of livestock, that the rank and file had in mind—not the building of cities. And unfortunately—although they were slow to realise it—they had come equipped with many a handicap in the way of immediately successful issue. Farming, in the widest acceptance of the term, is an art painfully acquired and transmitted through a long series of generations, but which is every year born anew and reshaped in the personal experience of each individual farmer. And each farmer clings tenaciously to the rules of his art, which as integral part of his consciousness he deems all but unchallengable: and it is well for the farmer, and for the community for which he works, that he should be possessed of so much tenacity—so long as he stays at home. For these rules of the art of farming concern the general environment of the particular country in which they have been progressively developed; of the particular district, nay, in the matter of detail, of the particular farm. Glance over the division fence and these rules are apt at time to become awkward exceptions: no longer general rules. In ultimate analysis, they represent delicate subconscious adaptation of the farmer's mentality to the mean conditions of his environment: economic means, climatic means, and means of the physical attributes of the soil with which he has to deal: let these means stray but ever so little from well-defined limits, and the farmer must go to school again.

Let us return to our emigrant farmers, whom we left straining at the leash, but wantonly kept back from farming by unaccountable delays in surveying their prospective farms: and let us consider what were the chief farming handicaps that had accompanied them to Australia. The first and most obvious of these was complete lack of knowledge of the climatic conditions under which they would be called upon to farm: and since instinctive climatic knowledge had ever been the very background to such farming lore as they were possessed of, for several seasons they must necessarily have groped in the darkness of ignorance rather than farmed: and in the process, may be, gambled away their limited means in climatic experiments.

The second handicap was the fact that such farming experience as they had brought out with them had in the main been acquired in a country in which the mean yearly fall of rain was distributed with tolerable evenness over the 12 months of the year; in which a fortnight of dry weather was deplored as a drought; in which owing to a high degree of humidity in the atmosphere surface evaporation was exceedingly low, and in which the growing period of annual crops usually extended over a relatively long period of time. Burning hot winds were known only from hearsay, and the climate generally was mild, humid, and relaxing, except for occasional winter severity.

Farming experience built up under such conditions must necessarily have failed when first confronted with a climate of relatively low rainfall, of relatively high temperatures, and combining unusually high rates of surface evaporation: in which the rainy season was usually confined to six months of winter and early spring—which seasons had of course to be painfully determined by new comers from the northern hemisphere—in which in one and the same locality the yearly falls of rain varied capriciously within a range of very wide limits; in which the satisfactory falls and distribution of rain over the hills and higher levels and coastal areas rapidly gave way to difficult rainfall conditions over vast plains and inland districts; in which scorching hot winds had to be recognised as not uncommon during the long summer months; and in which apart from limited areas of high rainfall, the usual growing period of annual crops was relatively short, varying from season to season, according as the rainy portion of the year extended more or less into late spring, and very occasionally even into early summer.

Such, then, were the climatic conditions which were to put to the test farming experience gradually acquired in the fertile, humid British Isles: conditions essentially similar to those of the African shores of the Mediterranean Sea with this difference, however, that North African summers never knew the bracing changes which Polar winds invariably bring to South Australia; but diametrically opposite to those under which our emigrant forefathers had learnt their farming: conditions which for the great majority could only be guessed at, and hence were yet to be discovered and mastered in the hard school of personal experience. And in the circumstances shall we not perhaps agree with John Morphett—probably the wisest and most level headed of the leaders of those early days—when in reply to the outcry against "delayed country surveys" he observed that in his opinion "the inefficiency of the Surveying Department did not affect private interests or the public weal as might have been expected: and the experience of the climate, soil and seasons which agriculturists were gaining without risk was, he thought, cheaply purchased in the probable loss of interest on capital."(⁷)

Sir John Morphett
(*By courtesy of Archives*)

The third and last handicap to which reference would be made could perhaps best be described as an economic hotchpotch, including: the density of the friendly British population contrasted with the scattered and more or less hostile tribes of Australian aborigines; the amenities, public utilities, and mutual exchange of services which such densities of population usually implied; easily accessible means of communication, in the shape of good roads, canals, and rapidly expanding railway systems; (⁸) easy social intercourse and relationships; adequate provision for the schooling of children and religious observances; adequate medical and hospital facilities; and finally from the farmer's special standpoint, orderly specialisation of callings admitting of easy contact with blacksmiths, carpenters, wheelwrights, masons, &c., according to the requirements of the moment, coupled with adequate market organisation for the various farm products.

All these resources, both material and spiritual, which the British farmer had come to look upon as part of the necessaries of life, and which in any moment of special need he could summon to his assistance—and many others that have not been mentioned—the pioneer farmer of the Australian wilderness must soon have realised that for him they were no more than wistful memories, and that thereafter he must depend on his own exertions only. The man who on his homeland farm took a daily round of inspection of his few acres, and issued instructions to his farm hands from the comfortable back of a smartly hogged and docked cob, soon discovered that in Australia he must give up the saddle and follow the plough, or whatever farm implement might

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(⁷) *The History of the Rise and Progress of South Australia*, 1839, by John Stephens, page 103.

(⁸) In Great Britain there were 71 miles of railroad in 1835; 1,857 miles in 1840; 6,621 miles in 1850; and 10,433 miles in 1860.

happen to be seasonable at the time. To such an extremity was he driven because to his mind wages paid in Australia for farm labour were extravagantly high, and he felt that he could no longer afford to keep up the farm staff to which he had been accustomed at home. Moreover at the time *competent* farm labourers were few and far between in Australia, and frequently unobtainable at any wage. It follows therefore that the farmer whose means permitted of the employment of labour had to add to his other anxieties those of instructor in farm manual operations. This absorption of owners in the details of the working of farm implements was not without influence on the progress of Australian farming: it was freely admitted by manufacturers of agricultural machinery that many of the improvements made in their machines originated in suggestions of farmers themselves. At this stage I desire to draw attention to one point only: it was notorious that all Australian *moving* implements, even to harrows, had progressively been provided with seats; the ploughman no longer followed the plough, but drove it from a more or less comfortable seat. From the purely philosophic aspect of the question one might wonder whether such an improvement would have been brought about had not 80 to 90 per cent. of the drivers of Australian implements been owners or owner's relatives. What was the mental attitude to this question in 1843 may be gauged by the following extract from the *South Australian Register:* "Too many ploughmen have the habit of leaning with all their weight on the stilts: this they call resting themselves: it is a practice that ought to be checked inasmuch as the plough is not in right trim, and therefore cannot do the work right, and what is of great consequence, one-third more draught is added to the cattle. On trial by a dynamometer a wooden plough 11½ stones weight, cutting a furrow 9in. x 5in., acted with a resistance of 25 stones (Dutch) in a friable soil; in strong heavy land with a furrow 10in. x 7in. the resistance was equal to 33 stones. The plough was so well adjusted that in the language of ploughmen it went alone—a most important consideration. *A heavy fellow lying on the stilts is equal to the draught of an additional pair of bullocks.*"(9)

We have seen and approved of John Morphett's assessment of the damage done to individuals and the community by the "delayed country surveys," namely, a mere loss of interest on capital unavoidably idle, which moreover he represented as cheap payment for experience in climate and seasons, otherwise gratuitously acquired by would-be farmers: and on the whole, looking at the matter broadly, he was probably right: but as unfortunately was too frequently the case, even in the most successful of human contrivings, there was always somebody who had to pay: and notwithstanding the "success," some were broken in the process of salving the community; its weaker members no doubt; those temperamentally unable to adjust themselves and their slender means to quite unforeseen conditions. They had come to Australia prepared to farm, but when from no fault of their own they found themselves unable to do so, nothing better occurred to them than to wait until such time as they would be allowed to do what they had been prepared to do, from the very first day that they had set foot on Australian soil. But again to their dismay they unexpectedly found themselves faced with the exceptionally high costs of living of a Colonial community in which all the necessaries of life had yet to be imported from abroad. In 1838, 1lb. of mutton or beef, a 2lb. loaf of bread, were each sold at 1s.: and 1lb. of fresh butter cost 4s., and of salted butter 3s. to 3s. 4d.(10) In 1839, the price of the 2lb. loaf had risen to 1s. 6d.; fresh butter was selling at 3s., and salt at 2s. 6d. per lb.; eggs at 3s. per dozen;

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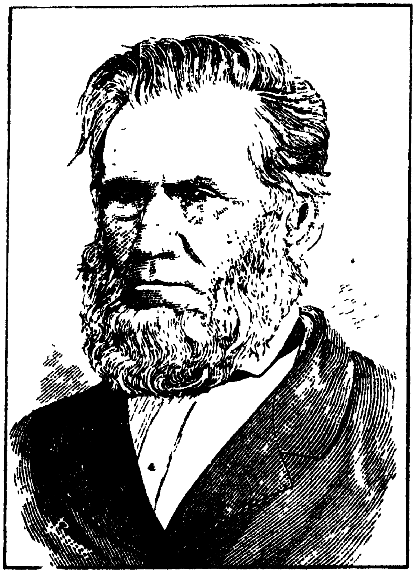
(9) *South Australian Register*, 29th March, 1843, page 4, col. 1.

(10) *South Australian Register*, 14th July, 1838, page 4, col. 4.

milk at 8d. to 1s. per quart; potatoes at 25s. to 35s. per cwt., &c. (¹¹) It was realisable that before prices such as these the meagre resources of expectant small farmers would gradually melt away: such idle implements and plant as they had brought out with them would in the course of time be converted into cash, or bartered for provisions; later on their town allotments would be disposed of, and finally their precious country land orders would go: and then the full circle to the ranks of casual labour would have been completed. True, eventually, they might be able to hire themselves out as farm servants, they and their families, to more prosperous or more fortunate farmers, still able to afford such luxury: some farmers, indeed, with less easy access to ready cash than others, provided their farm hands with rations, and gave them in addition an interest in the standing crops or in the increase of the flocks and herds: but no cash: others again paid their men in rations and "land." Let us hope in these circumstances that many of those who were broken during the long waiting period did eventually succeed in building up the farms of their early dreams.



John Barton Hack.

But not many gave up the fight without a struggle: avenues of employment began gradually to present themselves in the young rising colony: the City of Adelaide was a-building: public works of various kinds were being started: the demand for artisans and craftsmen, slight at first, became gradually more pressing and relatively high wages were soon paid. Hence it was not uncommon to find intending farmers with a craftsman's bent taking up work as masons, blacksmiths, carpenters, or in the absence of something better, as casual labourers: and instead of wasting away, their original capital gradually increased in size from such savings as they were able to set by from their wages.

In order to stress the latter position it is worth considering by way of illustration the case of John Barton Hack and his brother Stephen, who although not actually "small" farmers, were nevertheless anxious to husband, and if possible, to add to their resources whilst waiting for their farm land. Fortunately the elder brother kept a detailed and interesting diary between the 18th June, 1836, and the 11th May, 1839. In order to make the position clear I have given below *verbatim* extracts from J. B. Hack's diary. It should first be stated that the Hacks reached Holdfast Bay *via* Launceston on the 11th February, 1837: they brought with them from Van Dieman's land, among other things, a bull, some heifers, nine working bullocks, 400 sheep and a few goats.

1837.

"17th February. We are moving our goods with the bullocks as fast as we can to the place at Glenelg we have fixed on as our temporary abode. We shall let our bullocks at about 60s. the day for the dray as soon as we have a little done of our own work. We have already agreed to take goods a mile off the beach for 10s. a load."

"18th February. I feel more than half inclined to do something in the torekeeping line. There are many articles which settlers are much in nt of which I can get by the *Isabella* from Launceston, next time. Any-

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(¹¹) *South Australian Register*, 5th October, 1839, page 4, col. 3.

thing we can do to realise an income before farming can bring a return is of great consequence to us.''

''26th February. We and all those who have come here anticipated confidently that the site of Adelaide would be on the shores of the Gulf, or in some harbour which would make the city itself a seaport. The Surveyor-General has fixed Adelaide five miles from Holdfast Bay, and five miles also from Port Adelaide, so that emigrants have to convey everything for that distance, and all having come out under this idea, and also thinking that Sydney and Launceston would send cattle, &c., find themselves in an awkward dilemma (excepting the enterprising Hack Bros.). There is an immense amount of property spoiling both at the Bay and at the Port for want of proper means of conveyance; and the labour of conveying even moderate packages over the sandhills on the beach is tremendous, and the men's health has suffered much in consequence. Our team of oxen and drays is the first attempt which has been made here to land cargoes regularly and convey them to their destination. We have very high offers made to us by the (South Australian) Company and others to carry goods for them and shall be glad to avail ourselves of the opportunity.''

''5th March. We hope to be able to buy a few acres of town land to erect our cattle buildings on as we shall not have the country sections surveyed these months. This will be to some of the small settlers a great drawback as they cannot begin to improve any land till that is done, and in the meantime they are living on their means, and Colonial prices are always rather high. We took up a load to Adelaide for a person yesterday for £3 after having taken one for ourselves in the morning. We should have had, we think, some difficulty if we had not had some means of obtaining a supply of ready money. We have also made something of a quantity of porter which we took off Capt. Hart.''

''16th March. We have six oxen missing since Saturday, and this evening heard of them and Stephen rode across the plain eight miles to find them. Two came home safely, but the third sad to tell dropped down dead a mile or two from the house. We set to work late as it was to butcher and flay him as it was only from his having drunk too much water that his death happened. We shall send half of him to the *Buffalo* to-morrow, and shall realise more than his cost to us, but nothing can replace his services to us at present.''

''25th March. Our bullocks earned us £15 this week and have also done a good deal for us. No bad thing that we have an income of this sort to keep up our spirits. We intend to buy land for ourselves and brothers on Tuesday at the sale of town land to the amount of £200 to £300 and shall then have land we can cultivate if we wish, besides being a profitable investment of capital. They are expected to fetch £5 per acre (actually the town acres averaged £6 6s.).''

''28th March. The sale of town acres has gone off with great spirit and has realised besides the 437 preliminary acres about £4,000. We have bought 60 acres—but we have not yet received the account—chiefly for Gates and Henry: it will be an excellent investment for them.''

''7th April. We continue to earn £15 per week with one team of oxen besides doing our own work. We have just put our noble bull into the yokes this week and he works well.''

''11th April. I sold a lot of butter ex *Isabella* by which we cleared £25, which is pretty well for a beginning.''

"14th April. Engaged with the Governor to supply the *Buffalo* with water previously to her leaving for Sydney—at the same rate as we are now carrying for others—and as it will be back carriage, it will be all clear profit."

"29th April. We are doing well with our bullocks, as they have earned as much as £12 in one day."

We have here a good example of what an alert, bustling personality in certain circumstances could do, whilst others could think of nothing better than silently or vociferously bewailing their fate. Delay in "country surveys" had no terrors for J. B. Hack—although had he but known it nemesis was awaiting him round the corner: indeed he made of it stepping stones to a progressively improving financial position. To his carting and storekeeping businesses he soon added a small dairy farm located on his recently purchased town allotments: and here he attracted the envious attention of the zealous manager of the South Australian Company—David MacLaren—who in informing his London Directors of his intention to build up a Dairy Farm for the Company added: "He"—J. B. Hack—"sells milk at 6d. per pint and fresh butter at 3s. per lb. A deal of dissatisfaction has been created at these prices, but the people have to submit"(12) But MacLaren, inadvertently no doubt, omitted to state at what prices he proposed to sell the Company's milk and butter, when available. A year later when it had become very obvious that the Company's competition with retail traders was not viewed with particular favour by the community generally, and the Company had prudently decided to withdraw from its anomalous position, it was to Hack again that MacLaren's thoughts reverted: "I have had," he wrote, "some correspondence and frequent interviews with Messrs. J. B. and S. Hack on the subject of transferring to them the commercial business of the Company. I cannot say anything further than that I hope this negotiation will terminate favourably."(13)

David McLaren

Unfortunately for him, J. B. Hack's early successes in South Australia were not to be of long duration. In 1839 he became interested in two "Special Surveys," one on the River Para (4,000 acres) and the other, "The Three Brothers," in the neighbourhood of Mount Barker, where he resided and worked a 600 acre farm. In 1843, James Allen, a young man farming at Brown Hill Creek, and whose only title to fame were two home letters that have come down to us, stated in one of them that he had been driven to Mount Barker by his Quaker friend Barritt "to attend the selling up of one of our nobs, Barton Hack, a Quaker. . . . I was much pleased with the gardens of the bankrupt which are superior to any in the colony."(14) And thus poor energetic John Barton Hack, who a few years back had known how to turn into victory what many had accepted passively as inevitable defeat, overflushed with success perhaps, with too many responsibilities on his hands may be, was caught unprepared by the economic blast that laid low so many of his fellow colonists.

(12) David MacLaren to Edmund Wheeler, 25th August, 1837.

(13) David MacLaren to Edmund Wheeler, 21st August, 1838.

(14) James Allen to his father, 1st March, 1843.

(*To be continued.*)

Free-Water Investigations in the South Australian Areas of the Murray Valley

[A. L. TISDALL, B.Ag.Sc., Commonwealth Research Station, Merbein.]

Free Water Investigations are being carried out in the principal River Murray Irrigation Areas in South Australia under control of an "Irrigation Investigation Committee" constituted by the Department of Lands. The personnel of the Committee is as follows:—Mr. W. J. Colebatch, Deputy Director, Department of Lands; Mr. A. G. Strickland, Chief Horticulturist, Department of Agriculture; and Mr. A. V. Lyon, Council for Scientific and Industrial Research; Mr. Geo. Quinn was a member of the Committee prior to his retirement.

Mr. A. V. Lyon directed the investigations on sites selected by the Division of Soils in reference to soil type. The co-operation of district officers of the Departments of Lands and Agriculture of South Australia enabled the investigating officer, Mr. A. L. Tisdall, to examine the conditions on extensive areas. Mr. Tisdall's report is presented below.

I. Introduction.

The problem of unduly high water tables is one that has arisen sooner or later in most irrigation settlements throughout the world, as irrigation practice generally entails excess, rather than insufficient, irrigation water. Perhaps this is natural, as the effects of insufficient irrigation are evident immediately by affecting the current year's production, whereas excesses are reflected by soil wastage in later years.

The problem is a serious one, as free subsoil water frequently renders land wholly or partially unproductive. Especially is this so in the Murray Valley, where, associated with free water movements, there is generally a decided migration of soluble salts in an upward direction.

There are two effects on plant life associated with free water:—

i. A direct effect on the aeration of the root system.

ii. Plant injury from excess soluble salts, even though the water table be below the root zone.

The latter effect is the more important, and must be regarded as permanent, since reclamation of so-called "salty" land is usually a matter of extreme difficulty under Murray Valley conditions.

Investigations of the problem in the South Australian portion of the Murray Valley during the period 1933-36 have followed three main lines:—

i. Examination of existing free water conditions.

ii. The relation of free water to irrigation.

iii. The relation of free water to agricultural drainage.

An account of the work carried out along these lines is given below.

II. Examination of Existing Free Water Conditions.

(a) *Procedure.*

The method used was to examine free water levels at a number of points in long-distance sections embracing various soil types, the objects being:—

i. To determine the existing levels and extent of free water.

ii. To observe fluctuations in level throughout the irrigation season.

In the Berri area three, and in the Barmera area two, such lines of 12ft. test wells were put down in 1933. In 1935 four lines were put down in Renmark, and these are discussed later. The test wells used are simply 2in. down-piping, perforated at intervals, and closed at the bottom. The wells have a loose lid, and are sunk 11ft.

into the ground. Surface contours were obtained in a preliminary survey, and on sinking the wells free water was found comparatively near the surface over considerable areas. The levels have been read monthly throughout the winter months, and weekly throughout the irrigation seasons, and the results are graphed in relation to contour and the incidence of irrigation. The ideal readings would be just before, and at intervals after, each irrigation, but in an irrigation district on a roster system that is hardly practicable. The weekly readings give almost the same information, and are easily obtained.

In addition, a survey of the horticultural plants in the vicinity of the wells has been made annually to ascertain their reaction to various free water conditions.

(*b*) *Results.*

In most cases levels rise markedly, and in some cases 7ft. or 8ft. after each irrigation. In many cases, also, rises in level precede the actual irrigation of the soil in the vicinity of the well. By sinking extra test wells in appropriate places, and by manipulating the dates of irrigation of adjacent holdings, it was possible to show that subterranean water movements from adjacent irrigated land were often responsible for rises in the water table

In general, the conclusions to be drawn from these studies are:—

i. Free subsoil water is present in the majority of soils in these areas throughout the year.
ii. In some cases irrigation of one holding may influence the water table level on adjacent holdings.
iii. Present district practice is responsible for the maintenance of a free water level, within 11ft. of the surface, in most of the areas concerned.
iv. There is a definite relation between water level and the condition of surface soil and plant. Where the level is maintained near the surface throughout the year in nearly all cases the soil appears salty, and the plants do not thrive.
v. There appears to be no direct relation between soil type and incidence of free water (Fig. 1).

The water table tends to reach a basal level during the winter months, and fluctuates above this level in the summer months, generally sharply rising after each irrigation (Fig. 2). Immediately after an irrigation there is often a temporary water table which drops rapidly in a few days; but thereafter drops much more steadily until the advent of the next irrigation, or of equilibrium during the winter period (Fig. 2).

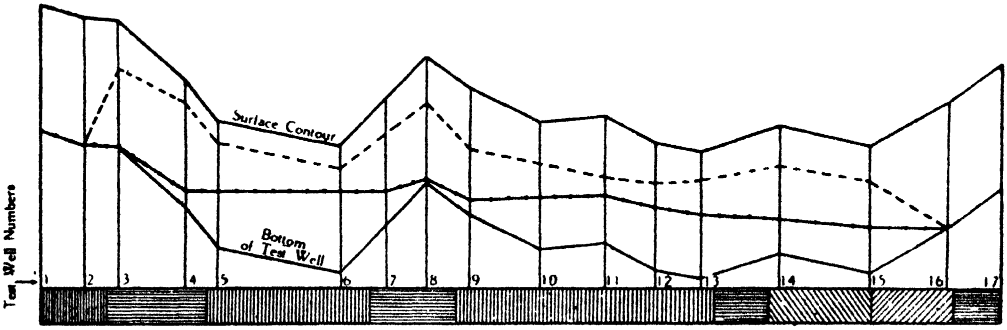

Fig. 1.—Average free water levels in relation to soil type. Section D Barmera.

Fluctuating Water Table shown thus - - - - - -

Permanent .. . . ————

Soil Types ▥ Barmera Sandy Loam ▧ Berri Sand

▤ Waikie Sand ▨ Nookamka Sandy Loam

Scale:—Vertical: 1in = 15.5ft. Horizontal: 1in. = 15.5 chains.

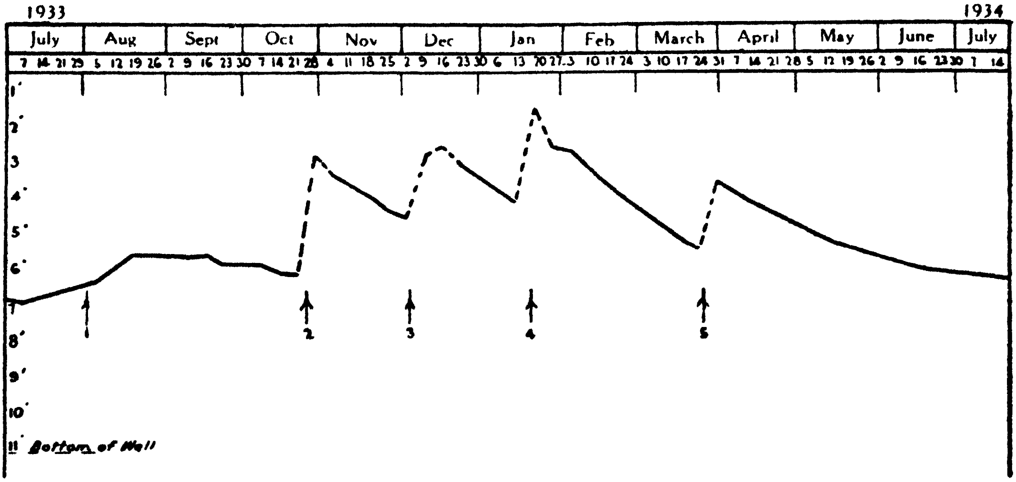

FIG. 2.—Water table fluctuations over Irrigation Season 1933-34.
Well No. 1. Section C Berri.
Dates of Irrigation shown thus ↑
Water level thus ———
Temporary unstable level thus – – –

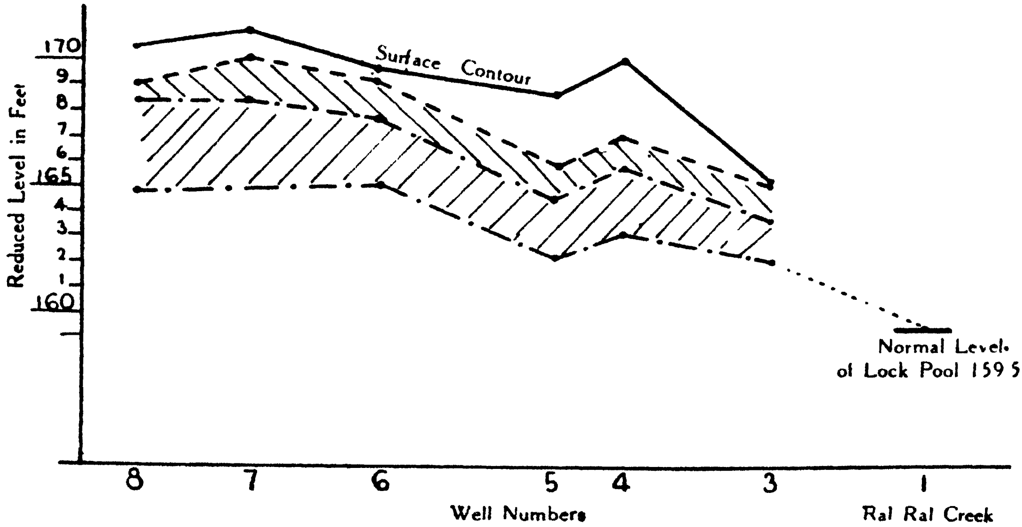

Fig. 3.—Free water fluctuations (interim results), Block E, Renmark, Section B.
// = Free water fluctuations, August, 1935, to April, 1936.
⟍ = Temporary rise due to 5 inches rain, January, 1936.
Horizontal Scale: 1in. = 38.2 chains.

III. Extension to Renmark Areas.

The method of using test well lines to obtain information on the extent of the problem in an area has been extended to the Renmark districts. Several lines were established in Renmark, Block E, and Chaffey areas in 1935, with this object. These lines, however, have an additional aim, and that is to give information. if possible, on the influence of the river and Ral Ral Creek levels on the heights of the water table in various parts of the settlements. Here, again, surface contours have been obtained. In addition the Department of Lands has records for the last five years from a number of observation holes in various parts of the Renmark areas. The observations so far obtained indicate that:—

i. The water table is continuous right to the creek or river (Fig. 3).
ii. Water levels on irrigated country rise with irrigation. The fluctuations are similar to those shown in Fig 2.
iii. General water levels have been steadily rising for the last five years.
iv. As a rule the table is higher in irrigated country than the surrounding dry land, even though the latter is on a lower contour.

IV. The Relation of Free Water to Irrigation.

(a) *Plot Lay-out and Procedure.*

With a view to determining the effect, on both plant and water table, of using smaller amounts of water than is the usual practice, plots have been laid down in various centres along the river—at Renmark, Berri, Barmera (both Nookamka and Loveday), Waikerie, and Pyap. It was established by Barnard (1) that the root zone of the sultana vine is comparatively shallow in the river soils. That this is the case with all the important vine varieties grown along the river has been borne out by observations on many different soil types. The majority of vine roots are within 2ft. of the surface, and on some soil types much shallower.

Fruit trees, also, with few exceptions, appear to be comparatively shallow-rooted. The aim in irrigation, then, is to moisten the soil to the depth of these roots, and to prevent further penetration as much as possible.

It was recognised that the method of application of water, and the amount applied, would vary with the soil type; so, where possible, each site is on a different soil type, with an environment that permits rapid irrigation. Nine such plots, in the above-mentioned districts, have been laid down. The soil-types examined include:—

i. Bookmark sandy loam.
ii. Berri sand.
iii. Winkie sand.
iv. Barmera sandy loam.
v. Berri sandy loam.
vi. Loveday sandy loam.

The above soil types were named and described by the Soils Division, C.S.I.R. (2), but the Waikerie and Pyap soils have not yet been defined. The Pyap soil is a light sand, probably similar to Winkie sand, the Waikerie soil being slightly heavier in texture. Test wells were installed at the top and the bottom of the irrigation run on each plot. As opportunity offered, more soil types were included, if possible, in different districts, in order to demonstrate methods of irrigation to growers. An additional site was chosen in Mypolonga in 1935.

A system of multifurrow irrigation was adopted on all sites, because this system seemed to suit the conditions best. Sprinkler irrigation, either surface or overhead, is probably superior, but it is comparatively expensive. Moreover, all these settlements, except the Loveday section of the Cobdogla Area, are laid out with channel systems, both for supply and distribution within the holdings, and the cost of a change-over would be considerable. Flood irrigation can be ruled out on all except the soils with relatively little grade, as the majority of the soils scour too readily.

Actually the system adopted, that of multi-furrow irrigation, is a modified flood system, in that as many furrows per row as possible are used, in order to apply the water quickly and evenly. Modifications are necessary on practically every holding, but obviously must be left to the individual. Change of the furrow position in a row is sometimes beneficial in preventing high concentration of the salts parallel to the irrigation furrow.

"Initial" and "soakage" rates of flow were used on all plots. This simply means that the flow of water is so arranged that a large stream reaches the end of the furrow as rapidly as possible. The rate of flow is then cut down so that the stream continues at the end of the furrow, with as little overrun as is consistent with adequate irrigation of the end portion of the furrow. In this way, the excess irrigation of the head ditch end of the row, which is obviously a natural defect of furrow irrigation, is reduced to a minimum.

In the preliminary single-furrow investigations, various periods of application and rates of flow were tried, and the effect on the soil examined in a number of ways:—

i. Free water levels before and after irrigation, both in test wells and in supplementary auger holes sunk at various points.
ii. Moisture contents at various depths.
iii. "Penetration" or "percolation"' profiles 24 hours after irrigation.

The latter were obtained by digging a trench across the furrow and graphing the lateral and vertical penetration of the irrigation water.

As the work proceeded, and information was secured from preliminary single-furrow investigations, the area under observation was increased from 1 or 2 rows to the full size of the observation plot, generally 1 or 2 acres.

(*b*) *Results.*

A few typical penetration profiles are shown in Figs. 4, 5, 6, and 7. Fig. 4 shows three profiles at various points along a furrow, namely, near the headland, halfway along the furrow, and near the footland. These profiles illustrate the much greater peneration of irrigation water obtained near the head-ditch in a "sand" soil-type. Similar profiles in Fig. 5 show the temporary delay in penetration where a "soft limestone" horizon exists at a depth of about 2ft. This type of penetration often occurs in the sandy loam soil types in the areas under examination. Figs. 6 and 7 show typical multi-furrow profiles for the two types of peneration. In the "sand" types, once the peneration from adjoining furrows links up, downward penetration is very rapid (Fig. 6). Where the soft limestone horizon is present, as in Fig. 7, downward peneration is delayed for a time.

The duration of irrigation on all sites was reduced far below district practice, and the plants continue to thrive, in some cases improving over the period of the experiments.

The usual methods of measurement of water applied to plots was to collect the water delivered per furrow in a vessel of known capacity, but, in addition, on the two Berri sites (Berri sand and Winkie sand), modified Dethridge wheels were installed. The number of sites on which these wheels can be used is limited, as they require a difference in level above and below of at least 4in.

In general, the plots were irrigated adequately with less than 4in. of water over each plot, as disclosed by both methods of measurement, this amount being well below the district average.

Perhaps the most important disclosure, however, lies in the more even distribution of water over the area, and consequent reduced additions to the water table below the root zone. On most of the sites, the irrigation water generally linked up with the water table, but it was found possible to limit the excess so that the level did not arise appreciably.

The results of these plots indicate that on runs of up to 6 or 7 chains, the soils on the sites examined can be adequately irrigated in six hours, or less, per furrow. In at least part of the irrigation season, all sites can be watered in less time, and the average time of application would be nearer 4 hours per furrow. This, of course, does not apply to longer runs, and on the "sand" types, 7 chains may be considered too long, the optimum length being about 4 chains.

Efforts to increase efficiency of irrigation, then, have followed certain lines:—

i. Increase in the number of furrows per row, which involves increase in the number of outlets in the head ditch.
ii. Reduction in time of irrigation.
iii. Introduction of "initial" and "soakage" rates of flow in a furrow, in contrast to the usual practice of a small constant stream throughout.

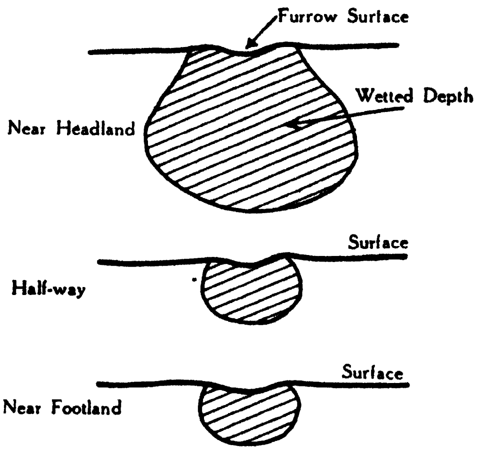

Fig. 4.—Percolation profiles with very light irrigation on a "sand" type.
Scale:—½in. = 2ft.

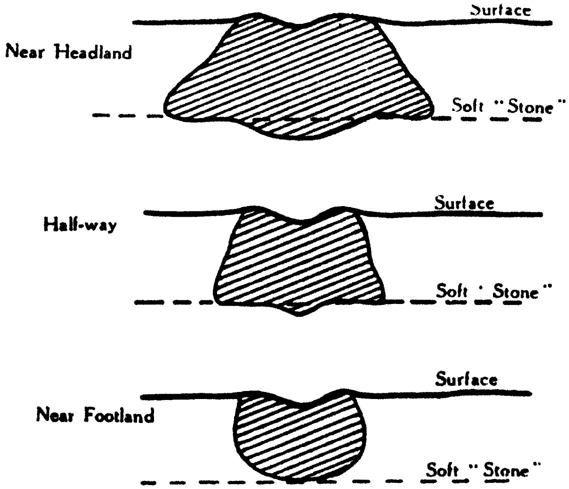

Fig. 5.—Percolation profiles, showing delayed penetration from a single furrow.
Scale:—½in. = 2ft.

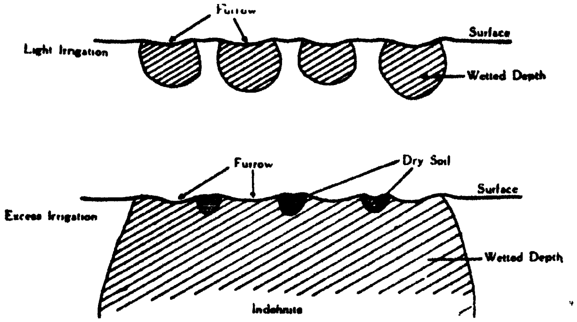

Fig. 6.—Percolation profiles of multi-furrow irrigation in a "sand" type.
Scale:—½in. = 2ft.

(*c*) *General Application.*

The methods outlined have other beneficial effects when applied to community settlements. All the irrigation settlements in the areas under discussion use water pumped from the Murray, and, consequently the organisation of an irrigation is governed by the capacity of the pumps. This necessitates the holdings being watered in rotation, and a fairly rigid roster system.

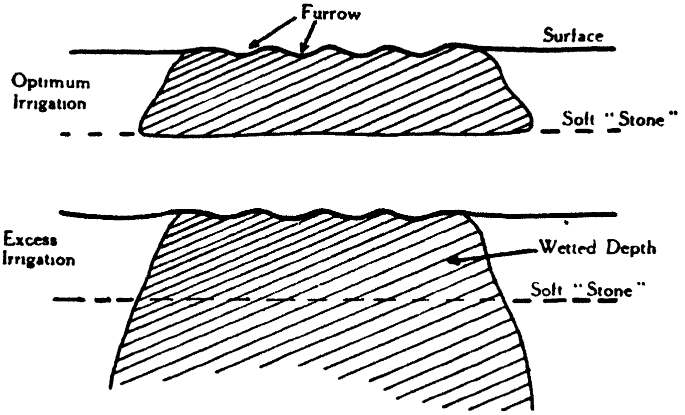

Fig 7.—Percolation profiles of multi-furrow irrigation showing delayed penetration.
Scale:—½in = 2ft

It will be evident, then, that quicker application of water on any one holding will enable the irrigation of a settlement to be completed in a shorter time. If advantage could be taken of this to bring the irrigations closer together the margin of safety in hot weather will be increased. Again, as the pumps are worked as near as possible at full capacity, the shorter the irrigation period the lower the cost of pumping per irrigation.

V. The Relation of Free Water to Drainage.

(*a*) *Description.*

In South Australia, drainage on any community basis, such as is being carried out in the Mildura districts, has so far not come into practice, although one scheme is under construction at Barmera. Perhaps the most striking development in drainage in South Australia in recent years has been the success of shaft-and-bore drainage at Waikerie. There, drainage is made difficult by the presence of stone strata of varying thickness, and at various depths.

In quite a number of cases in that area, below the soil horizons there are strata of stone of varying hardness, extending variously from a depth of approximately 5ft. to 20ft. or more.

In these cases it is the stone which bears most of the free water and the drains, which are generally laid on, or near the surface of this stone (*i.e.*, at about 5ft.), have water below them. The outfall for drainage systems in that area has been into shafts, originally put down to 6ft. or 8ft., and further equipped with a 4in. mining bore penetrating to about 100ft. The casing extends about 2ft. up into the shaft, and thus acts as a silt trap. The bores being watertight, only water above the 6ft. level could be removed. Recently, however, in a number of cases the depth of the shaft has been increased to 20ft., by blasting and "gadding" the stone, and following this the tile drains feeding the shaft have ceased to run, and the shaft has drained the strata from below the depth of tile drainage.

(*b*) *Procedure.*

Test well lines have been put down in various directions, both radiating from single deepened shafts, and linking up two such shafts. Records have been taken over several years, and the range of effectiveness of this type of direct drainage has been examined, the records being graphed in relation to surface contour of the well-sites. Soil profiles in both shafts and test well holes were examined wherever possible.

(c) *Results.*

It was found that with shallow shafts, say, 6ft. or 8ft., the surrounding water table tends to follow surface contour (Fig. 8). With the 20ft. shafts, however, there is a definite water level slope to the shaft, the demonstrable sphere of influence being at least 4 chains (Fig. 9). Fig. 10 shows the gradient in a sandy soil with a steep surface contour. It is thought that the range of influence may sometimes be considerably greater, as drains 6 and 8 chains away have stopped running after a bore has been in operation for some time. However, the effectiveness of the bores varies considerably. This is readily understandable when the very heterogenous nature of the strata is considered. Stone is rarely encountered above 4ft. to 5ft., but below that depth there are three possible profiles down to the depth of the shaft (generally about 20ft.) :—

i. No stone present.
ii. Stone present to the full depth.
iii. Stone strata, generally 1ft.-3ft. in thickness, interspersed with horizons of sandy or clayey material.

Similar variations are encountered when sinking the 4in. bore, although it is usual to strike stone at some depth in the bore.

These variations explain why the effect of a bore on the water table is so difficult to demonstrate with test wells, but from fairly complete observations it would appear that the usual radius drained efficiently by a bore is about 6 chains, the water table being lowered to a safe depth below the root zone.

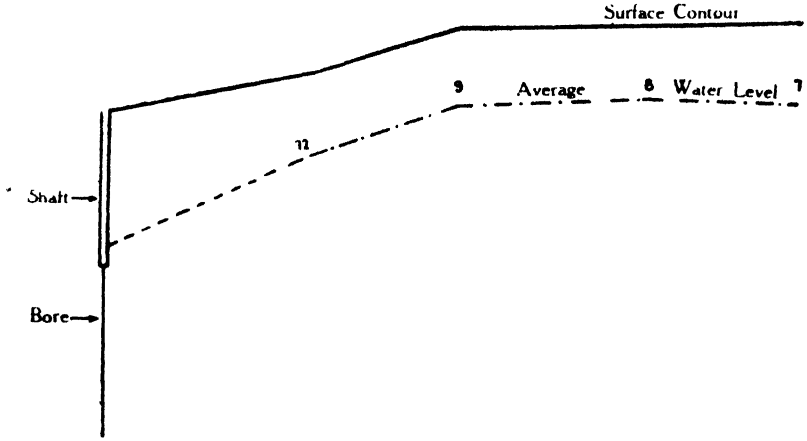

Fig. 8.—Free water levels in the vicinity of a shallow shaft at Waikerie. The water level tends to follow surface contour
Approximate scales:—Horizontal: 1in. = 2.5 chains. Vertical: 1in. = 9.9ft.

VI. Cover Crops.

A practice of value in control of free water, which should be mentioned here, is that of sowing cover crops. Tick beans and other leguminous crops are useful in this respect, and where the land is too salty for legumes to do well, barley will often grow. On some sandy slopes, difficulty is experienced in getting a satisfactory stand of leguminous cover crops, and here again barley and wheat are often used. The crops are ploughed in early, if possible before the vines sprout, so that they shall not compete with the horticultural plants.

As has been shown by West (3), and confirmed on lighter soils at Merbein, tick beans are very shallow rooted, about 70 per cent. of roots being within 8in. of the surface, and they have the effect of keeping the surface soil dry. Consequently, in a wet winter, rain water which would ordinarily raise the water table appreciably (rises of up to 2ft. have been observed) is held in the surface soil.

Interplantings with lucerne have been used with success on the heavier soils of the Murrumbidgee Irrigation Area, but with lighter soils there are obvious difficulties.

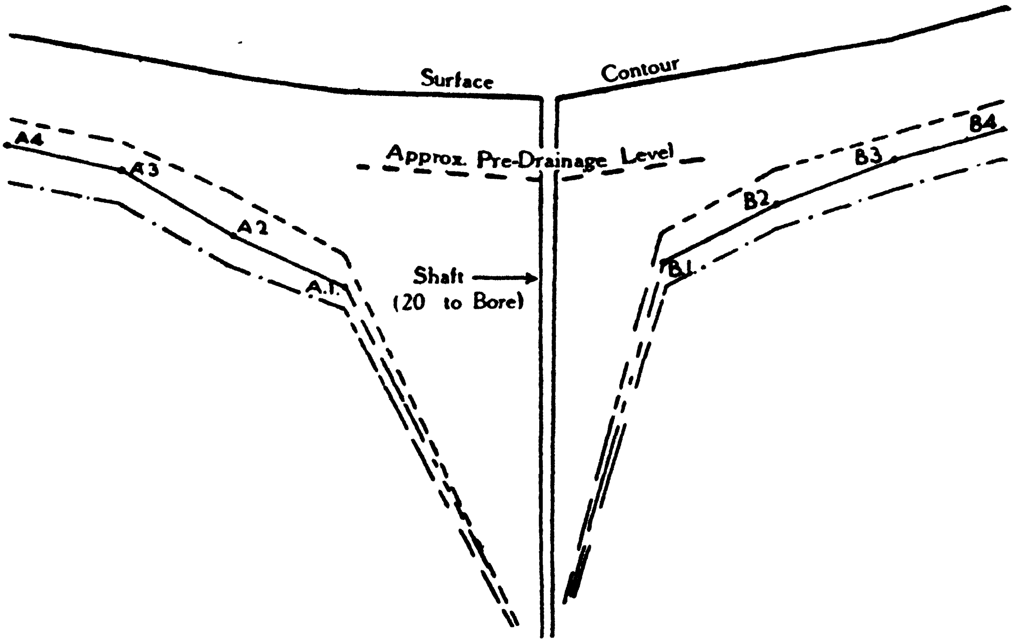

Fig. 9.—Free water levels in the vicinity of a deep shaft at Waikerie.
Usual upper limit of free water, thus — — —
Usual basal level of free water, thus — . — . —
Average level of free water, thus ————
Approximate scales:—Vertical: 1in = 7 1ft Horizontal: 1in. = 1.8 chains.

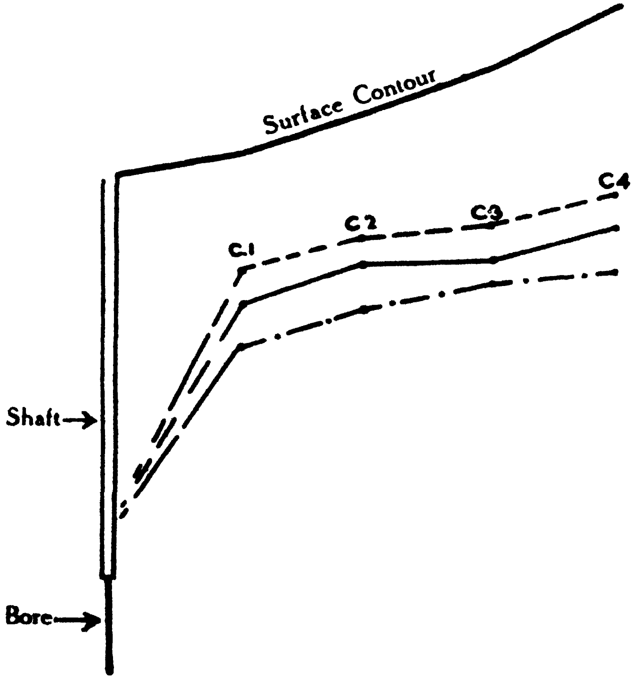

Fig. 10.—Same as Fig. 9, but with a much steeper surface contour.
Approximate scales:—Vertical: 1in. = 6.1ft. Horizontal: 1in. = 1.57 chains.

i. Rapid irrigation becomes impossible, as furrows become ineffective. The multi-furrow system being used demands clean cultivation.

ii. The lucerne is using most moisture when the requirements of the horticultural plants are greatest. This is not so serious in heavy soils; but in lighter soils, with which we are chiefly concerned, surface drying-out in summer is almost as great a problem as free water.

Lucerne is, however, useful on the footland, *i.e.*, at the end of the irrigation run, to use up any surplus water from furrow irrigation. It is important that this lucerne be looked on primarily as a drying-out agent, rather than a source of fodder. By this is meant that the lucerne should not be designedly watered as a crop, but should merely be present to absorb the over-run.

VII. Conclusion.

In conclusion, then, it may be stated that investigations in South Australia have been concentrated mainly on the prevention of the accumulation of free water by more efficient irrigation. In addition, in the Waikerie settlement, the possibilities of shaft drainage have been investigated, the general impression being that in many cases in limestone country the shaft-and-bore system may be regarded as more efficient than tile drainage.

Efficient drainage is not always possible, and is always costly. Further, the practice of leaching salt out of surface soil with heavy applications of irrigation water should be undertaken only where satisfactory subsoil drainage exists.

Acknowledgments.

Thanks are due to Mr. A. C. Ingerson, of Berri, a part-time officer of the C.S.I.R., for assistance in initiating the work, and in continuing the necessary observations; to Messrs. Cock, Gordon, Goodchild, Horner, and Shillabeer, of the Department of Lands; and Messrs. Fotheringham and Leishman, Department of Agriculture, for their co-operation throughout the investigations.

References.

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2. T. J. Marshall and P. D. Hooper.—C.S.I.R. Bulletin 86.
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Commercial Flower Production.

Under the above title Part I. of Bulletin No. 96, an excellent handbook on the Commercial Production of Flowers, has been issued by the Ministry of Agriculture of England at a cost of 2s. 6d. net. The Bulletin deals with early outdoor spring flowers, and Part II., now in preparation, will deal with Summer Flowers, pot plants and those suitable for bedding.

Feather-Eating Ducklings.

Asking for the reason and cure for ducklings that have acquired the habit of feather eating, the Snowtown Branch of the Agricultural Bureau has been advised by Mr. C. F. Anderson (Chief Poultry Adviser), that this is principally due to incorrect feeding, and although the birds are getting plenty of bran and pollard mash and soaked wheat, there should be, in addition, a percentage of meat meal in the mash. Ducklings require a percentage of meat meal at all times in their mash. and it is suggested that meat meal be added at the rate of 1lb. per 100 ducklings to the mash once a day.

Celery Growing

[By N. R. QUINN (Assistant Horticultural Adviser).]

The consumption of celery in Australia has increased considerably during the last four or five years, South Australia being the largest producer of this vegetable, and having a ready outlet for surplus production in the Eastern States. During the past season (1936) Victoria absorbed approximately 82,000 crates, and New South Wales 50,600 crates. Queensland and Western Australia also took small quantities, and approximately 50,000 crates are consumed locally.

Celery, known botanically as *Apium graveolens* (Linn) is indigenous to Britain, Europe, and the temperate parts of Western Asia, Africa, California, and New Zealand; the garden form has been grown by the French since the seventeenth century.

From the indigenous types, modern delectable strains have been raised and to-day are used for salads, soups, and as a cooked vegetable. The edible portion is the enlarged leaf stalk, this stalk usually being bleached white by exclusion of the sunlight.

Locality.

The greater portion of the celery produced in South Australia is grown on the Adelaide Plains within a radius of 10 miles of the City of Adelaide.

Soil.

Celery seems to do well on all types of soil in this locality, and these comprise deep red sand in the western district, alluvial silt on the banks of the River Torrens, chocolate loam over-lying a stiff red clay, and the stiff black Bay of Biscay soil at the foothills of the Mount Lofty Ranges.

Climate.

The climatic conditions on the Adelaide Plains are most favourable to the growth of celery—warm, sunny days with low humidity being frequent during the growing period.

Seed.

A majority of prominent growers have, by careful selection of seed, built up strains of their own, which are not obtainable from seedsmen. The usual method of selecting seed in this State is to mark well-shaped and vigorous plants in the field at the time of harvesting; when convenient, these selected plants are transplanted to a place in the garden where they will not be disturbed until the seed has matured in January or February. Seed matures too late for use in the following year's crop, and two years' supply is usually kept in hand.

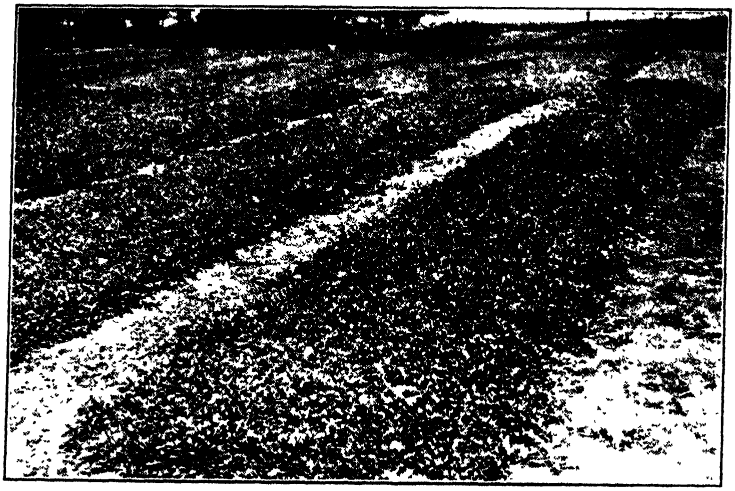
Selected Celery Heads for seed.

[Photo E W Pritchard.]

The plants selected for supply of seed should be sprayed consistently to reduce "Leaf Spot" infection. When the seed has matured, it should be thoroughly dried by spreading on canvas sheets, and when dry placed in air-tight containers until required. Owing to the possibility of carry-over of "Leaf Spot" on seed, it is good practice to disinfect the seed in some manner. One method of disinfection is known as the hot water treatment.

Hot Water Treatment for Disinfection.

The required amount of seed for the season's planting is placed in a muslin bag, and submerged for 10 minutes in a large vessel containing water heated to a temperature of 136° F. (The maintenance of the temperature is very important). After removal from the hot water, the seed is placed in cold water for two minutes. Seed intended for planting at some future date should be thoroughly dried prior to storing. The hot water treatment has been reported to retard, and also reduce the germination slightly. (J. C. Niell, N.Z. *Journal of Agriculture*, vol. 46, page 289.)



The Seed-bed.

[Photo.: E. W. Pritchard.]

There are approximately 60,000 seeds in an ounce of celery seed, and approximately 75 per cent. is usually germinable.

The Seedbed.

Fresh soil should be used, if possible, for preparation of the seedbed in order to avoid trouble with root fungus diseases such as "damping off." If it is not possible to use new soil, partial sterilization of beds may be achieved by treating the soil with a solution of formalin consisting of 1 pint of formalin in 6 gallons of water, distributed evenly over 24 square feet. This method will prove more effective, if bags saturated with the solution are placed over the treated seedbed to retain the active fumes. The bed should remain thus covered for 48 hours, and sowing of the seed should not take place until all fumes have disappeared. Dissipation of the gas may be hastened by loosening the surface of the treated bed.

The soil in the seedbed prior to sowing should have had plenty of organic matter incorporated with it so as to retard drying out. The difficulty of sowing such fine seed evenly over the bed may be overcome by mixing it with whiting or by sprinkling it with an ordinary household pepper pot. When the seed is evenly distributed over the seedbed, it is covered very lightly, first, with fine soil, and then with a mulch of stable manure. Watering should be carried out daily during dry periods.

First seedings take place during September and October, and extend into January and February in order to make provision for a continuous supply of seedlings. During the growing period the seedlings must be weeded and sprayed with 6:4:50 Bordeaux Mixture. When the seedlings are from 8 to 10 weeks old the tops are cut back, and the tap roots are cut before planting out in the field.

Planting in the Field.

Prior to planting out, the field should, preferably, have received a dressing of 20 to 25 tons of well rotted stable manure per acre, worked deeply into the soil. If the soil is inclined to dryness at the time of planting, the seedlings should be watered as soon as possible after placing.

The double row system of planting is most commonly used, and is as follows:—The seedlings are set in the soil with a "dibber"; and are placed 10 inches apart in double rows also 10 inches apart. The seedlings are not placed directly opposite each other in the double rows, but are staggered. The double rows are spaced 3 feet apart in the field. This system of planting necessitates approximately 26,000 plants per acre. The double rows of plants are set out in a shallow furrow to facilitate irrigation.

Celery planted out in the field
[Photo.: E. W. Pritchard.]

Manuring.

In addition to the basal dressing of stable manure, the young seedlings will require dressings of some nitrogenous artificial manure from time to time. The gardener has to use his experience in this matter, and no definite programme can be set down. Celery is a voracious feeder, as can be seen from the large number of feeding roots that develop from a healthy vigorous plant. The usual dressings of nitrogenous fertilizer are from 3 to 4cwts. of sulphate of ammonia per acre. This is distributed along the rows as close as possible to the rooting system, lightly hoed in, and followed by an irrigation. The growth of the celery plants after placement in the field should never receive a check as a result of insufficient moisture or plant food.

Celery "Boarded-up."

Blanching.

When the celery has nearly reached its maximum growth, light is excluded from the leaf stalk in order to effect blanching. The old method of covering the leaf stalk from time to time with soil as it extended, is not now practised in South Australia. The usual method is to place light-proof boards on each side of the double rows.

The boards are pressed in tightly against the plants, and are held in position by stakes driven into the soil. Sometimes sheets of corrugated galvanized iron are used, these sheets being cut in halves lengthwise. The most convenient size of "board" to use is one about 12 feet long and 15 inches high. The celery is usually "boarded" for a period of a fortnight or three weeks, the vigour of the plant at the time of blanching governing the actual period. If the celery is "boarded" for a too lengthy period, the leaf stalks become "pithy," and greatly reduce the quality of the product.

Harvesting Celery

Harvesting.

The period of harvesting extends from about the middle of April to early in October. The method of harvesting employed is to cut the plant off at ground level with a sharp spade or knife where the outer leaf stalks stool out from the plant.

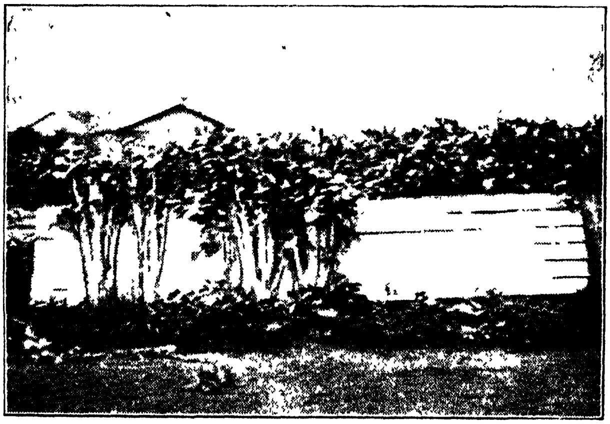
Preparing for Market.

The outer ragged leaf stalks are stripped until the remainder has an attractive appearance, these outer leaves being of poor quality. Limited quantities of stripped stalks may be disposed of at preserving factories. When the product is intended for export, the top foliage is cut off to the length of the crate, and heads are graded for uniformity of size. Prior to packing, the celery should be washed free of soil, and in the case of export to New South Wales, it is necessary for all particles of soil to be removed. The washing operation is performed with a strong stream of water from a hose, and is termed "jetting."

Insect and Fungus Diseases.

Green Aphis is probably the most troublesome insect pest with which the celery grower has to contend. This pest may be kept under control by spraying or dusting with a nicotine sulphate compound. The treatment is most effectively applied when the atmospheric temperature is from 70° F. or greater.

Celery Leaf Spot or Blight (*Septoria apii*).—This fungus disease is seed borne and attacks all the above-ground parts of the celery plants, usually being more conspicuous on the older leaves and leaf stems. The disease appears on the leaf first as small yellow spots, which become brown, and later almost black. Unless the leaf spot is checked in its early stages, the major part of the leaf surface may become infected, and under favourable climatic

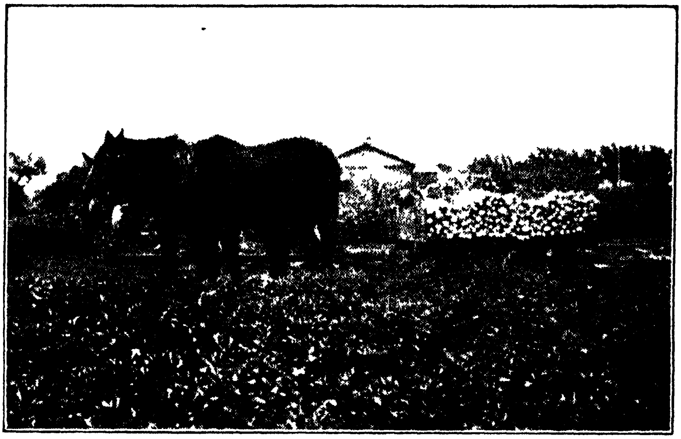

Strippod heads (left); unstripped on right.

conditions, the plant will eventually die. This major disease will attack the celery plants from the time they are in the seedbed until harvest, and throughout the growing period young growth should be kept covered with 6:4:50 Bordeaux Mixture. Just prior to "boarding up," it is also a good practice to spray the leaf stalks. The spores of this fungus may be carried over in the remains of a diseased crop of the previous season, and refuse from a diseased crop should always be gathered and destroyed. Spraying should be carried out every 10 days during showery weather, and less frequently in dry weather.

Pink Rot (*Sclerotinia sclerotiorum*).—This fungus disease is not very common in South Australian celery beds, and in the later stages can be easily identified by the pink colouring of the infected area. The infection is usually at ground level, and an entry is made through a wound or growth crack. The disease is first noticed as a watery lesion on the stalk. Thorough spraying with Bordeaux Mixture will help with the control, and it is also desirable that all diseased plants should be removed and destroyed. If the disease becomes serious, crop rotation should be practised.

Black or Brown Heart Disease.—Under certain conditions in the field, celery is susceptible to a disorder known as "Black Heart." The first symptom is a tip burn on one of the inner young leaves. This may quickly spread to a greater part of the immature foliage, including the heart leaves. In the worst cases the entire heart is killed, and even many of the older leaves and petioles are badly damaged. A bacterium (*Bacillus carotovorus*) has been found associated with the trouble, which is more prevalent during hot dry weather early and late in the season. It is thought that Brown Heart is primarily caused by the above-mentioned Bacillus, and that an insect vector is concerned in the distribution of the organism.

The disease is under investigation, but as yet no definite control measure can be suggested.


Carting Celery to the packing shed

Production of Butter and Cheese.

The production of butter and cheese for October, 1936, was:—Butter, 2,515,549lbs.; cheese, 1,770,574lbs.

The production of butter and cheese for November, 1936, was:—Butter, 1,962,219lbs.; cheese, 1,573,670lbs.

Herd Testing

[By H. J. Apps, Senior Dairy Adviser.]

Herd Testing has been persistently advocated by the Department of Agriculture for a period extending over 25 years. Several associations are now in existence and are performing a useful function, because farmers are beginning to realise the importance of improving dairy herds and the possibilities in this line of work for increasing the profits of milk production. According to the results obtained in other countries, as well as the experiences of progressive farmers in this State, it would seem possible to increase the average production of our herds by many gallons of milk and pounds of butterfat.

The Danes are repeatedly quoted in evidence of what can be accomplished by herd testing, breeding and good feeding. The Danes are the most highly trained dairymen in the world to-day. Besides, they are credited with being keen business men, hence a repetition of their activities should be of interest.

In 1881 the average production of Danish cows was 110lbs. of butterfat; in 1934 there were close on 1,600 herd testing associations, comprising 700,000 cows, with an average production of 298lbs. of butterfat. With the increased value of lands in the Hills district it is becoming more essential to produce more per acre.

If dairymen would only figure out how much butterfat they are producing per acre it might awaken their interests to the advantages of herd testing. In this direction, the results obtained by a member of a New Zealand association are interesting. This member, with 120 cows, topped the association average with 325lbs. of butterfat in 252 days. He farms 160 acres, and in 1935 he took 235lbs. of butterfat per acre and averaged over 200lbs. for the last five years. Cow testing associations are probably the most talked of method of dairy development work. Certainly there is no co-operative plan of dairy improvement work in more general use. Yet I am sure that, on the whole, the true purposes of this plan are not fully understood, and on this account are often abused. Many members fail to make full use of their association, and, since an association is simply made up of 20 individuals, the association naturally amounts to no more than its members make it. Some may join with the idea of finding out what their cows tested, and others simply to have a check on the buyer of the product.

It is the leakages that destroy any industry, and dairying is no exception to this; in fact, it may be said that many cows in the herd are being milked twice a day and utilising food which could be made better use of. The experience of farmers proves that, in some instances, heifers have been saved to replenish the herd from cows with low milk and butterfat production. There is no short cut to the method of building up the herd; the only sound procedure is to test and not guess. Many striking instances of improvement have taken place in herds in this State, and the achievement of Mr. C. Morris, of Monteith, is worth quoting. In 1920 his 45 cows averaged 294lbs. of butterfat in 296 days, certainly a very creditable performance, when compared with the average production of cows in this State of 165lbs.-170lbs. butterfat; whereas in 1934-35, 18 cows averaged 494lbs. of butterfat in 269 days.

One member, in a recently formed association, increased the production of his herd by 60lbs. butterfat per cow by discarding about 10 of his low-producing animals. Many farmers make an effort to test their own herd, but owing to the detail work entailed therewith, especially the figuring out of each cow's production, it invariably happens that the work is not carried on.

It is largely due to this reason that herd testing associations fill the breach, as the recorder visiting the farm each month carries out such work as weighing the milk, testing, &c., whereby the farmer is not called upon to follow any detail work.

Testing enables the dairyman to know if the sire is bringing about improvement, and where it is discovered that an animal is bringing about the desired results, such an animal should be secured by one of the members of the association. In this direction, if members will closely study the performances of the sires in the various herds and arrange to make exchanges, it should not occur that the good animal has been slaughtered.

In selecting a sire for the herd of an unknown quantity, the production records of the close-up animals in the pedigree should receive the most consideration. Of course, type and individuality of the bull and of his ancestors should be considered.

If the remote ancestors are being considered, there is the risk of little influence being transmitted. The fact must not be lost sight of that in four generations there are 30 ancestors and in 10 generations no less than 2,046. There is no gainsaying the fact that the development and use of bulls with ability to transmit to their daughters an increased capacity of milk and butterfat production over that of their dams is the most effective method of building up the production of the herds. By the continued use of animals that have proved themselves to be potent for certain characteristics, however, the element of chance is diminished and real improvement can be hoped for.

A pure bred bull must be used. It does not mean that the average dairyman must obtain pure bred dams, but he should endeavour to grade up the herd to pure breds by the successive use of bulls of the same breed. It is the concentration on purity of blood of a known quantity that will give results. Many dairymen cannot always follow this reasoning, as their herds may be a mixture of breeds and several of their daughters are producing well; it generally follows that such animals owe their ability to greater production to the influence of a pure bred bull. However, the fact cannot be disputed that all records throughout the world for milk and butterfat production, whether daily, weekly, monthly or yearly, both collectively and individually are held by pure bred cattle.

Any scheme which has for its object the improvement of our dairy stock must provide for a study of the records of performance of the individual cow, as well as deal with the management of the herd, including its care, feeding and breeding of animals to replace those which are discarded in the weeding process. Individuality can only be determined by the weighing and testing of each cow's milk. Dairymen are often misled in their attempt to average the production of the herd. In estimating the number of cows, they may fail to include all cows which have calved during the period and only record the maximum number milked. A dairyman may be a very good judge of a dairy cow, but it is impossible to state by external appearance whether an animal will produce 200lbs., 300lbs., or 400lbs. of butterfat.

At the commencement of an association members are requested to select their two best and two worst cows, and the information gained by this method is generally an eye opener for the dairyman. No member, so far, has correctly placed his selections.

Herd testing is distinctly and immediately of value to every dairy factory for several reasons. If dairymen supply more milk or cream from a given number of cows, or a certain number of acres, it means that by receiving more raw product from the same locality it assists the operations of the manufacturer. Further, directly a member begins testing each cow individually, he commences to take more interest in the herd and is likely to supply not only more, but milk or cream of a better quality.

The importance of feeding the herd on rational lines becomes apparent to the dairyman. In the cost of production, it is generally found that the highest producer gives milk more economically than the low one. The relative cost of different feeds is not always in accordance with their milk producing value. It is quite possible to feed a cow expensively and not produce any better results than could be obtained with other feeds or combinations costing much less.

Reasons for Testing.

1. Cow testing enables one to find out the poorest cows, those not paying for their feed so that they may be culled.
2. It shows that many cows, considered only average, are really the best in the herd.
3. It points out definitely which cows are the best producers, both in milk and butterfat.
4. It proves that many cows, considered the highest in test, are really the lowest.
5. It helps to increase the total yield of milk and butterfat from the same number of cows.
6. It brings in larger returns from fewer cows.
7. It helps to build up a profitable herd quickly, because heifers can be selected from the best cows.
8. It allows more discrimination in feeding, giving grain according to the yield.
9. It demonstrates that it pays to feed liberally.
10. It causes the dairyman to take more interest in his herd.

Cereal and Manurial Experiments in South Australia

[By R. C. Scott, Chief Agricultural Adviser.]

The majority of the agricultural experiments in progress are being conducted by private farmers working in co-operation with the Department. In this way results of local importance are secured, whilst as men cropping similar land are able to view the growth and development of the crops planted as well as ascertain the yields, they are in a position to arrive at fairly definite conclusions as to the most suitable variety or fertiliser for their particular conditions.

In addition, the replication of trials over a wide range of soil and climatic conditions is of advantage in ascertaining the value of certain varieties or materials for special circumstances or for the State as a whole.

The seeding and harvesting of all plots are supervised by officers of the Department, who also calculate the areas and yields. In the majority of cases the tests have been in progress for a number of seasons, and therefore the danger of differences due to accidental causes is very much reduced.

Harvesting Experimental Plots at Appila.

It should be pointed out that these experiments mean a good deal of inconvenience to the men who conduct them, and it is desired to record the appreciation of the Department for the careful manner in which all operations have been carried out. The areas range from one to three acres for each plot, and therefore allow for the utilisation of ordinary farm implements, but the cleaning and adjustment of the machine between one plot and the next means loss of time, an important item at the seeding and harvesting periods, and the farming community generally is grateful for the assistance given.

Since the phosphate content of superphosphate is not quoted in the same way in all States of the Commonwealth, the amount of P_2O_5 added to the soil together with the actual weight of manure is given in the tables of yields.

In calculating net cash returns an allowance of 3s. 4d. per bushel has been made for wheat, and 4s. per cwt. for 45-grade superphosphate.

EXPERIMENTS AT APPILA-YARROWIE.

(Conducted on the Farm of Mr. W. E. Lange.)

The work at this centre has for its object the determining of the optimum dressing of superphosphate for wheat crops planted on fallow land.

Appila-Yarrowie is about 150 miles north of Adelaide, whilst the farm of Mr. Lange is situated immediately south of the township, or about 10 miles north-east of Laura. The country is gently undulating in nature, and the soil a fertile brown loam, capable of producing high wheat yields under adequate rainfall conditions. Rainfall is the limiting factor, and the annual precipitation since the plots were commenced, together with the mean for the district, is given in the following table:—

Rainfall at Appila, 1927-35.

Month.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Means.	
										1927-35.	61 Years.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
January	0·16	0·24	0·14	—	0·20	0·03	0·76	0·75	1·51	0·42	0·63
February	0·15	1·18	0·69	0·49	—	2·06	—	0·44	0·01	0·56	0·66
March	0·67	0·45	0·13	—	0·65	2·64	0·53	0·33	1·36	0·75	0·88
April	0·20	0·21	0·32	0·27	1·04	3·21	0·24	1·10	1·37	0·88	1·14
May	0·80	1·37	0·85	0·86	1·20	0·94	1·85	0·09	0·53	0·94	1·47
June	0·87	2·07	1·26	0·76	2·40	2·12	0·59	0·65	1·11	1·31	1·76
July	1·25	1·60	0·59	1·52	1·27	1·90	1·20	0·98	0·84	1·24	1·53
August	1·63	0·41	1·23	2·01	1·88	2·59	1·96	2·16	1·96	1·76	1·71
September	0·46	0·80	1·85	1·06	1·63	2·22	2·34	2·16	0·96	1·50	1·65
October	0·35	1·12	0·19	2·42	0·46	1·29	0·28	2·58	2·17	1·21	1·30
November	0·62	0·01	0·41	0·42	0·96	0·02	1·16	3·52	0·25	0·82	0·87
December	0·50	—	1·79	1·19	1·16	0·23	0·68	0·56	0·96	0·78	0·99
Totals	7·66	9·46	9·45	10·98	12·85	19·25	11·59	15·32	13·03	12·17	14·59

Useful Rainfall at Appila.

Rains.											
Seeding (April and May)	1·00	1·58	1·17	1·13	2·24	4·15	2·09	1·19	1·90	1·82	2·61
Winter (June and July)	2·12	3·67	1·85	2·28	3·67	4·02	1·79	1·63	1·95	2·55	3·29
Spring (August and October)	2·44	2·33	3·27	5·49	3·97	6·10	4·58	6·90	5·09	4·47	4·66
Early summer (November)	0·62	0·01	0·41	0·42	0·96	0·02	1·16	3·52	0·25	0·82	0·87
Totals	6·18	7·59	6·70	9·32	10·84	14·29	9·62	13·24	9·19	9·66	11·43

From the above figures it will be noted that over the nine-year period the total rainfall is almost 2½in. below the average for the past 61 years. As the mean is only 14.59in. this is very appreciable, representing practically one-sixth of the normal quantity.

1932 was a wet year with over 19in., whilst 1927 was particularly dry.

However, the feature about the rainfall at Appila is that each season there is at least one month in which crops suffer an appreciable check. Even in 1932 practically no rain was recorded for the month of November, and crops ripened their grain under difficult conditions. As a rule the rain which falls between the months of April and November has the greatest influence on crop growth.

The mean for this period since the experiment was started is 9.66in., that is to say, about 1¾in. below the average.

It will be seen therefore that the experiment has been conducted under much dryer conditions than are normal for the Appila district.

Manurial Experiments, Appila, 1927-35.

Year.	No Manure.		½cwt. 45 Grade Super. (11½lbs. P_2O_5).		1cwt. 45 Grade Super. (23lbs. P_2O_5).		1½cwts. 45 Grade Super. (34½lbs. P_2O_5).		2cwts. 45 Grade Super. (46lbs. P_2O_5).		3cwts. 45 Grade Super. (69lbs. P_2O_5).	
	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
1927.......	5	49	10	11	11	26	10	5	8	23	8	41
1928.......	8	48	9	24	10	5	11	30	11	5	10	55
1929.......	5	10	8	29	9	36	10	45	12	30	13	41
1930.......	1	50	3	4	3	12	3	4	3	32	4	37
1931.......	9	17	9	57	9	51	10	11	10	15	12	24
1932.......	19	12	21	37	22	27	22	12	22	39	22	23
1933.......	13	10	15	52	16	45	16	22	16	36	16	30
1934.......	11	31	15	54	14	23	15	25	15	16	15	0
1935.......	11	55	16	44	17	54	18	36	18	45	18	56
Means, 1927-35 .	9	38	12	21	12	51	13	8	13	20	13	41
Value at 3s. 4d. p.b.	£1 12 1		£2 1 2		£2 2 10		£2 3 9		£2 4 5		£2 5 7	
Nett value with super at 4s. p.c.	£1 12 1		£1 19 2		£1 18 10		£1 17 9		£1 16 5		£1 13 7	

Over the 9-year period the highest average yield, namely, 13bush. 41lbs. per acre, has been harvested from the plot receiving 3cwts. of superphosphate per acre. The mean returns increased according to the quantity of manure added, but except for approximately 3bush. between the no manure and ½cwt. dressing, the differences were not great, being simply a few pounds in each case.

It is therefore a matter of calculating the net value to ascertain whether such increases have been payable so far as the wheat crop is concerned. When this is done it will be seen that the maximum cash return has followed the application of ½cwt. of superphosphate, but the difference is not significant, being only 4d. per acre when a further ½cwt. of manure is added and 1s. 5d. for an additional cwt. Consequently if only the grain return is taken into consideration it would appear that an application of about 1cwt. of superphosphate at seeding time is sufficient in the Appila district, but on the other hand it is generally recognised that heavy dressings of fertiliser have influence not only on the wheat crop, but also on the pasture which follows. Therefore, if the farm is being worked on a rotation including grazing, as should be the case in this area, the superphosphate drilled in with the wheat crop should approach 1½cwts. per acre.

EXPERIMENTS AT NELSHABY.

(Conducted on the Property of Mr. F. Jose.)

The Nelshaby district is situated about 180 miles north of Adelaide, and comprises portion of the plain land that lies between Port Pirie and Port Germein. It is an area which enjoys mild winter conditions, and crops mature early in the season. The soil is chiefly of a sandy nature, is red in colour, and overlies a good clay subsoil. It is inclined to drift, but generally speaking possesses fairly good natural fertility, and provided that the finishing conditions are satisfactory is capable of producing high returns of either grain or hay.

The rainfall records are shown in the following tables, but as the Commonwealth registration of the falls was discontinued some years ago it is not possible to give the average for the district, but only that for the nine years that have elapsed since the experiment:—

Rainfall at Nelshaby.

Month.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Means. 1927-35.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
January	0·08	0·32	0·16	—	0·10	0·03	1·92	0·17	1·93	0·52
February	0·21	1·99	0·56	0·41	0·22	2·19	—	0·60	—	0·69
March	0·94	0·58	0·16	—	1·10	1·86	1·10	0·14	1·44	0·81
April	0·30	0·55	0·32	0·56	1·42	5·15	0·76	0·50	1·12	1·19
May	0·73	2·08	0·98	0·71	2·00	0·50	1·03	0·12	0·45	0·96
June	1·02	2·32	0·53	0·51	3·10	3·47	0·76	0·61	1·19	1·50
July	0·81	2·08	0·90	1·78	0·94	1·14	1·76	0·89	0·19	1·17
August	1·09	0·30	1·29	2·01	1·26	1·21	1·51	2·30	0·98	1·33
September	0·64	0·96	1·26	0·97	0·98	1·05	3·37	2·82	0·50	1·39
October	0·46	0·81	0·06	2·43	0·47	0·67	0·31	2·88	2·37	1·16
November	0·83	—	1·29	0·53	1·50	0·65	1·05	1·28	0·04	0·80
December	0·26	—	2·46	0·81	0·06	0·51	0·20	0·27	—	0·51
Totals	7·37	11·99	9·97	10·72	13·15	18·43	13·77	12·58	10·21	12·03

Useful Rainfall at Nelshaby.

Rain.										
Seeding (April-May)	1·03	2·63	1·30	1·27	3·42	5·65	1·79	0·62	1·57	2·1
Winter (June-July	1·83	4·40	1·43	2·29	4·04	4·61	2·52	1·50	1·38	2·6
Spring (August-October)	2·19	2·07	2·61	5·41	2·71	2·93	5·19	8·00	3·85	3·8
Early summer (November)	0·83	—	1·29	0·53	1·50	0·65	1·05	1·28	0·04	0·8
Total	5·88	9·10	6·63	9·50	11·67	13·84	10·55	11·40	6·84	9·4

The average annual rainfall at Nelshaby is low, amounting to only slightly more than 12in., whilst if the wet year of 1932 is excluded the mean precipitation is reduced to 11¼in. As a rule the critical months are May and November, with less than an inch in both cases, whereas for a 15-year period during which the official gauge was in operation the mean fall for May was 1.26in., and for November 1.01in.

The "Useful" rainfall totals only 9.49in., and therefore Nelshaby has been a difficult wheatgrowing area during the past nine years.

Manurial Experiments, Nelshaby, 1927-35.

Year.	No Manure.		½cwt. 45 Grade Super. (11½lbs. P_2O_5).		1cwt. 45 Grade Super. (23lbs. P_2O_5).		1½cwts. 45 Grade Super. (34½lbs. P_2O_5).		2cwts. 45 Grade Super. (46lbs. P_2O_5).		3cwts. 45 Grade Super. (69lbs. P_2O_5).	
	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
1927	8	28	7	55	7	0	7	11	9	35	11	2
1928	13	17	13	26	13	13	14	20	13	16	14	27
1929	4	50	7	47	9	33	9	48	9	24	8	24
1930	7	45	8	45	8	30	8	16	8	59	8	50
1931	17	3	18	14	19	25	18	5	18	12	19	44
1932	5	51	5	6	5	22	6	11	6	51	7	4
1933	8	45	9	5	9	50	11	10	10	38	11	13
1934	7	0	13	2	13	40	14	24	15	19	15	16
1935	9	45	10	21	10	17	9	27	10	11	12	37
Means, 1927-35	9	12	10	25	10	46	10	59	11	23	12	4
Value at 3s. 4d. p.b.	£1 10 8		£1 14 9		£1 15 11		£1 16 7		£1 17 11		£2 0 3	
Nett value with super. at 4s. p.c.	£1 10 8		£1 12 9		£1 11 11		£1 10 7		£1 9 11		£1 8 3	

The outstanding feature of the Nelshaby experiments is the small increase in yield between that from the plot which has not received superphosphate and the yields from those which have. The 1cwt. application of superphosphate has only resulted in an improved return of half a bag of wheat per acre, an exceedingly small amount as compared with the differences recorded for similar experiments in other parts of the State.

There is a steady increase according to the quantity of superphosphate added, but in no case is the improvement in yield at all substantial.

With wheat at 3s. 4d. per bushel and superphosphate at 4s. per hundredweight, the most profitable crop has been that following the ½cwt. dressing. The 1cwt. application resulted in a loss of 10d. per acre with increasing losses for heavier manurings.

However, there is little doubt that if the field was to remain out as pasture in the following year this loss of 10d. per acre for the additional ½cwt. of superphosphate would be more than made up by the increased grazing promoted by the extra superphosphate, and therefore dressings of about 1cwt. per acre are recommended for wheat crops planted on fallow land in the Nelshaby district.

(To be continued.)

Cream Grading and Cream Quality

[A Talk given by Mr. H. B. Barlow (Chief Dairy Instructor), over 5CL Broadcasting Station.]

During the last few years the demand for better quality products has been most marked and probably in no other branch of primary production has this demand been more noticeable than in the Dairying Industry, particularly with regard to butter.

In order to ensure that all butter exported from Australia should be at least of a standard which is approved for export, the Commonwealth Government has stationed a staff of graders and chemists in each State and a percentage of all butter submitted for export is subjected to a careful scrutiny by these highly trained officers. The result is that manufacturers have been compelled to pack and ship their goods under a description which is a true index of quality.

As an example, butter for export and also for local sale, is described as Choice, First Grade, Second Grade, and Pastry. Butter accepted as Choice quality must grade at least 93 points out of 100. First Grade butter grades 90-92 points, Second Grade 86-89 points and Pastry 80-85 points. Butter grading below 80 points is not accepted for export and must be disposed of, if possible, on the local market.

With the pressure being exerted in this manner, it can be readily understood that in order to obtain as much high quality produce as possible, the manufacturer must put forward every effort to keep abreast of this ever-increasing demand for higher quality.

There are certain essential factors which absolutely control the quality of the finished butter and the chief of these are:—

First: the quality of the cream on its arrival at the point of manufacture. Second: the ability of the manufacturer to process the cream to the best advantage. I will discuss these two factors, separately, although they are very closely allied as far as results are concerned.

Dealing with cream quality, I would first of all like to state that the term "quality," as used here, refers to the flavour and not in any manner to the percentage of butterfat present in the cream.

Although modern butter manufacturing methods may seem, and very often are rather complicated, the quality of the cream is still, and probably will remain, for our generation at least, the controlling factor in the manufacture of a good butter, notwithstanding that unscrupulous agents or representatives of manufacturers may state that their particular plants are capable of making high quality butter from any sort of cream. This cannot be done and, if credited for a moment, is, to say the least, an indication of ignorance on the part of the person giving it credence.

Different quality creams are only capable of being made into butter of comparative quality. This means that before the cream is processed, or manufactured into butter, it must be separated into its respective grades. This separating process is know as "Grading" and it can be accepted as a fact that efficient grading is the basis of successful butter manufacture. Grading cream, similarly to the grading of practically all food products, is done by taste and smell and as soon as convenient after arrival at the factory, the cream should be weighed, sampled for the butterfat test and graded according to its quality.

In all States of the Commonwealth the grading is done by men who are specially certified by the Government as being capable of carrying out this work.

Many producers not having been trained to develop an acute sense of taste or smell are inclined to look with suspicion on the opinion given by an efficient grader, but this viewpoint, although it does, and probably always will, give an excellent theme for discussion amongst dairymen, is quite wrong.

The opinion of a grader is just as correct and reliable as an indication of quality as that of a wine taster or any other trained expert and must be accepted as such.

From the point of view of the Department responsible for the carrying out of the requirements of the Dairy Industry Act, we find that cream graders and factory proprietors are much too prone to try and pass as satisfactory, too much inferior cream, in order to pacify their suppliers, than to grade correctly and notify the suppliers of inferior cream that their produce is not as good as it might be.

It was recently apparent to those in authority, that the tendency on the part of manufacturers to over-pay for inferior cream was becoming more marked. In order to check this retrograde step and at the same time try and keep up the quality of the butter, trained officers of the Department of Agriculture visited all factories, as far as possible, in the same district on the same day and in the majority of cases sent out Cream Grading Advice Notes to all suppliers of inferior quality cream.

I would ask all who received these advices to view them in the light of a means of helping to improve the produce and not, as many do, as a direct insult. If any have really made an endeavour to maintain a high standard of quality and have not obtained satisfactory results, please let us know and we will help all we can. Normal clean fresh milk, separated in a clean separator into clean utensils, kept at a comparatively cool temperature in a clean atmosphere, each separation being well mixed with the other cream immediately it is cool, and delivered to the factory as soon as possible in a comparatively cool condition, will guarantee a high quality product and make the duties of the Department and factory employees much simpler.

Before blaming the factory or Government officials I would ask all dairymen to consider carefully whether their methods of handling the cream are beyond criticism.

Is your milk always normal or do you use it too soon after the cow has calved? If milk is normal it will not curdle if boiled. This may possibly be from four to fourteen days after calving. How often do you test it? Do you always keep the milk from cows, slightly affected with mammitis or other udder inflammation, away from the rest of the milk? Are your methods of milking absolutely clean? Do you wash the cows' udders and teats with clean water and a little condy's crystals and with clean cloths? Are these cloths washed and boiled between milkings? Is the milking shed kept clean and free from dust, as far as possible? Is the milk contaminated by flies? Do you wear reasonably clean clothes for milking? Do you wash your hands after milking each cow? Have your buckets been thoroughly washed and scalded immediately after use?

This sounds very much like an application for an Insurance Policy or a form to be filled in after a motor accident but all details are under control and should be attended to.

A clean separator is one which is washed —and properly washed—morning and evening.

Proper washing does not mean merely rinsing with luke warm water, but consists of thoroughly scrubbing with warm water and some good alkaline washing powder and then thoroughly scalding with water as near to boiling point as is possible. The separator parts should be kept apart, to allow them to dry thoroughly and only assembled again just before use. The cleanliness of the separator is such an important factor in the production of high quality cream that I often think it would be a boon to the dairying industry if it were possible to enforce absolutely the dissembling and washing of this machine immediately after use. If a very heavy penalty such as delicensing for a period was imposed, the final result would be as effective as a dentist pulling out an aching tooth. In other words, being cruel to be kind.

Whilst discussing separators, always purchase as large a separator as you can afford and do not waste half the day turning the separator handle. Half an hour to an hour is quite sufficient time to waste on this operation, not an hour and a half to two hours, which is too often the case during the flush season. Never separate cream thicker than about 45 per cent. in summer and 40 per cent. in winter. Unless you are churning your own butter, very thick cream, testing 50 per cent.—60 per cent. is of no advantage to you or the manufacturer.

Milking buckets and cans should be well washed and scalded immediately after use and any utensils which are rusted, dented, leaky, or in any way hard to clean should be discarded. The use of petrol tins as milk or cream containers, unless the seams are first carefully filled with solder, is a very bad source of contamination. Use clean strainers with a thin gauze in preference to cloth.

The fact that cream will keep sound for comparatively long periods in winter should be sufficient evidence that temperatures have a very important bearing on quality. Therefore cool your cream as soon as possible and keep it in a cool, well aired place. A clean cool safe in a shady spot is much preferable to a stuffy, ill ventilated cellar.

To obtain the best results, cream should be delivered to the factory at least three times per week during the hot weather and not less than twice per week at any time. Always keep the cream as cool as possible during transit, and covering the can with a clean wet bag will be found to give excellent results, even during the hottest weather. Insist that all cream carters adhere to this practice and your produce will arrive at the factory in a much sounder condition.

Although to some these suggestions might seem unnecessary, unless they are carried out as a regular routine, trouble is certain to occur and cream will be classed as Second Grade, provided the factory grader carries out his work efficiently, and as far as this Department is concerned, we will endeavour to see that this is done.

Every year when the supply starts to fall off and the weather becomes hotter, the deterioration in the quality of our cream is most marked, and it is with a sincere hope that producers generally will endeavour to help in maintaining a better quality that I am discussing this matter.

Writing almost insulting letters to the factories or the Department will not have the effect of improving cream quality, although I am sorry to say that sometimes the factories may fall to the bluff and infer that the cream is satisfactory by paying for it as First Grade.

This practice will never help us to improve matters and, if carried to any extent, would seem to suggest that the manufacturers do not pay as much as possible for good cream, in order that they may be in a position to over-pay for bad cream.

Any dairyman who is sincere in his desire to produce a good quality cream, can receive all the help he desires from the Department of Agriculture at no cost whatever, and with absolute satisfaction guaranteed, provided he is a trier. Always remember that cream should be clean, cool, and collected often, if the best results are to be obtained.

Pasture Seed Certification.

SCHEME TO BE ADOPTED IN SOUTH AUSTRALIA.

Unqualified success has followed the New Zealand pasture seed certification scheme, and to-day farmers not only in the Dominion, but also throughout Australia, recognise that the purchase of certified seed assures them that the sample has been harvested from plants of good strain and quality, and is also free from objectionable weed seeds. So strongly is the advantage of certification felt that the seed trade and purchasers generally insist that wherever possible such seed shall be secured, and as South Australia is an important producer of Subterranean clover and lucerne seed it is necessary that some guarantee of this nature should be available in this State if we are to hold the markets we have at present.

Accordingly a plan has been drawn up to be put into operation this year. Briefly it involves the registration of fields from which seed is to be harvested. On the owner lodging an application for certification an officer of the Department of Agriculture will inspect the area to ascertain the presence of bad weeds, and also to see if the crop is free from disease and the plants of the strain claimed.

At harvest time each bag of seed must be left open for inspection, and after being passed, sewn and sealed with the official seal. In this connection arrangements for regular visits by the inspecting officer will be made. At the same time samples will be taken so that they represent the bulk of the seed in question, and submitted to the seed testing department for a purity and germination certificate. No charge will be made to growers for inspection and certification, and those who propose harvesting seed this season are asked to communicate with the Director of Agriculture, Flinders Street, Adelaide, as early as possible.

They should intimate the fields to be harvested, and also supply information as will enable the inspecting officer to locate the farm.

Certification on these lines is being adopted in the other States, and it is anticipated that in the coming season there will be a much readier sale for certified than uncertified seed.

The details of the scheme are as under:—

Certification.—The South Australian Department of Agriculture will certify seed of pasture plants harvested from approved crops grown on registered areas.

Weeds.—No area infested with objectionable weeds will be accepted for registration.

Registration Fee.—No charge will be made for registration of areas or certification of seed.

Application for Registration.—Growers wishing to submit areas for registration must make application to the Department of Agriculture. A new application must be submitted each year.

Inspection of Areas.—The area will be inspected by an officer of the Department of Agriculture when the plants are in the seed head stage.

Sealing Bags of Growers' Seed.—An officer of the Department of Agriculture will attend during harvest operations. He will weigh, brand and seal the bags of seed. The grower must supply scales for the use of this officer. If seed is not to be recleaned a sample will be taken by the officer for testing.

Grower's Declaration.—At the time of harvesting, the grower will be required to sign a declaration on the form prescribed, that all the seed submitted for certification is the produce of the registered area.

Quality of Seed.—All certified seed will be required to be of a standard satisfactory to the Department of Agriculture.

Re-dressing Seed.—The re-dressing of seed must only be commenced under the supervision of an officer of the Department of Agriculture, and seals placed on bags at harvest time must not be broken or the bags otherwise opened except in the presence of this officer. When the re-dressing is complete the officer will place in the top of each bag of re-dressed seed a certificate relating to its contents, attach an official descriptive tag, seal and brand the bags and record the weights.

Sample for Testing.—The officer checking the re-dressing will take a sample of the seed for testing, at the completion of which the certificate will be issued.

Notice of Intention to Harvest.—Growers are required to give reasonable notice of their intention to harvest seed.

Notice of Intention to Re-dress Seed.—Owners are required to give at least three days' notice of their intention to re-dress seed.

Record of Disposal.—The grower is required to notify the Department of Agriculture of the names of persons to whom he supplies certified seed and the amount supplied to each.

Dehorning Cattle.

Mr. H. B. Barlow (Chief Dairy Instructor), in advising the Pinkawillinie Branch of the best methods of dehorning dairy stock, says that there are two methods of removing horns from calves, either by preventing the growth of the horn button by the application of caustic soda or by cutting out the horn button by the use of a special dehorning instrument. If an instrument is available, the latter method is much preferable, and it should be done when the calf is about 6 months of age. The caustic soda method will give good results if carefully carried out. The procedure is as follows:—

As soon as the horn button is showing clear of the hair, cut the hair round the base of the horn for about 1in. Carefully cover this surface with vaseline or petroleum jelly.

Damp the horn and rub with a stick of caustic for a few minutes, being careful not to allow the fingers to come in contact with the caustic, and also be careful that none of the caustic is allowed to come in contact with the skin of the calf unprotected with petroleum. It may be advisable to repeat the process after two or three days. In the event of rain, &c., washing any of the caustic on to the calf's head, immediately wash it off and treat affected parts with some acid solution (vinegar, etc.).

To dehorn older animals satisfactorily, special dehorning instruments are available, although in cases of emergency a sharp saw can be used. The sawing process is slow and painful, and a proper instrument is much to be preferred.

In taking off the horns, it is essential to take a layer of skin at the base of the horn to prevent malformed regrowths, and to cause the skin to heal over in a clean manner.

After removing the horn, dress with Stockholm Tar, and if bleeding does not stop in a reasonable time, the blood vessels can be seared with an iron heated to a dull red, or dressed with an iron solution. Care must be taken to prevent the wound becoming fly-blown, and if flies are prevalent, constant inspection is advisable.

The Department of Agriculture has a set of dehorning instruments available for use of Dairy Advisers, and provided one of these officers is present to supervise the work, these will be made available to dairymen desiring to have their cattle dehorned.

Feeding Tests at Parafield Poultry Station

[By C. F. ANDERSON, Chief Poultry Adviser.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April, 1935, to 31st December, 1936.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal, 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

5. *Mash*, during autumn and winter.—Crushed barley, crushed wheat, chaffed greenfeed and meatmeal. During spring and summer the mash is varied, bran being substituted for the crushed barley.

Grain.—2ozs. wheat per day.

	No. Eggs Laid 1st April, 1935, to 30th November, 1936.	No. Eggs Laid Month of December, 1936.	Total Eggs Laid 1st April, 1935, to 31st December, 1936.
No. 1 Test	11,401	648	12,049
No. 2 Test	11,440	671	12,111
No. 3 Test	12,371	526	12,897
No. 4 Test	9,946	466	10,412
No. 5 Test	10,590	575	11,165

Egg-Laying Competitions

Official Single Test conducted at Parafield

Review of the Competition for the month of December, 1936, by C. F. Anderson (Chief Poultry Adviser) and A. Clifton (Competition Attendant).

The weather for the month of December has been very changeable, and has had a tendency to upset production. There have been several warm days with the temperature in the vicinity of 100 degrees, but not one that has caused any discomfort to the birds. Generally speaking, the absence of any prolonged heat wave has tended to a good average production. The monthly production was 55 per cent., which can be considered satisfactory.

Bird No. 449 owned by Mr. A. O. Dawkins in the Dry Mash Section was the first bird to reach 200 first-grade eggs. She laid the 200th first-grade egg on the 20th December, followed two days later by bird No. 315 owned by Mr. C. A. Maxwell—Wet Mash Section; bird No. 346 owned by Mr. J. G. Slee laid her 200th first-grade egg on 29th December. The Black Orpington owned by Willow Bend Stud Poultry Farm was the first of the heavy breeds to reach the 200 on 31st December.

In the teams of six birds, two reached the score of 1,000 first-grade eggs during the month. One team in the Dry Mash Section, owned by Mr. A. O. Dawkins (Birds Nos. 448-453), reaching the 1,000 on 22nd December, and Birds Nos. 7-12 owned by Mr. A. Young on 31st December. The laying of these two teams has been very satisfactory throughout the Test.

Early moulters.—Already there are signs of a number of birds going into an early moult, but as previous experience has shown, these birds are, without exception, those which have never at any time during the Competition been among the leading divisions. They have been more or less poor layers since the commencement of the Competition.

As usual, a glance through the progressive scores will show—with one possible exception—that the birds which were leading during the Winter Test are those which are laying the best at the present time. Among some of these birds which have been laying consistently heavily, however, there is a tendency for the size of the egg to decrease.

Two deaths were recorded during the month, bringing the total to 22 since the commencement of the Competition. This is equal to 4.4 per cent. of all birds competing.

The daily number of eggs laid throughout the month was 264.

LEADING SCORES TO 5th JANUARY, 1937.—

FIRST GRADE EGGS ONLY.

SECTION I.—WET MASH.

Class 1.—White Leghorns—351 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
C. A. Maxwell	209	315
J. G. Slee	207	346
S. Lambert	200	194
B. R. Whittington	198	215
Trios—		
A. O. Dawkins	550	85–87
W. M. Field	548	142–144
L. A. King	437	217–219
Williow Bend Stud Poultry Farm	532	295–297

Class 1—*continued.*

	Eggs Laid.	Birds Nos.
Teams—		
A Young	1,018	7– 12
W. M. Field	1,004	139–144
J. C. Normandale	984	235–240
R. W. McAllister	966	247–252

Class 2.—Any other Light Breed (Minorcas)—15 birds competing.

Singles—		
R. M. Yelland	156	371
V. F. Gameau	155	366
R. M. Yelland	139	372
Trios—		
Langmaid and Bettison	361	358–360
R. M. Yelland	301	370–372
V. F. Gameau	276	364–366
Teams—		
Langmaid and Bettison	576	358–363
V. F. Gameau	412	364–369

Class 3.—Black Orpingtons—45 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	203	381
A. G. Dawes	195	377
H. H. Gallagher	189	398
Willow Bend Stud Poultry Farm	187	380
Trios—		
Willow Bend Stud Poultry Farm	549	379–381
H. H. Gallagher	486	397–399
A. G. Dawes	486	376–378
H. J. Mills	470	385–387
Teams—		
Willow Bend Stud Poultry Farm	1,009	379–384
H. J. Mills	882	385–390
A. G. Dawes	829	373–378

Class 4.—Any other Heavy Breed—36 birds competing.

Singles—		
A. G. Dawes (Rhode Island Reds)	182	419
A. G. Dawes (Rhode Island Reds)	181	38
Willow Bend Stud Poultry Farm (Rhode Island Reds)	179	424
Trios—		
K. Pennack (Barnvelders)	447	439–441
K. Pennack (Barnvelders)	448	436–438
V. F. Gameau (Rhode Island Reds)	382	433–435

Class 4—*continued.*

	Eggs Laid.	Birds Nos.
Teams—		
K. Pennack (Barnvelders)	895	436–441
V. F. Gameau (Rhode Island Reds	655	430–435
A. G. Dawes (Rhode Island Reds	630	37–42

SECTION II.—DRY MASH.

Class 5.—White Leghorns—15 birds competing.

Singles—		
A. O. Dawkins	207	419
A. O. Dawkins	192	452
A. O. Dawkins	180	453
Trios—		
A. O. Dawkins	519	451–453
A. O. Dawkins	503	448–450
Willow Bend Stud Poultry Farm	378	454–456
Teams—		
A. O. Dawkins	1,022	448–453
Willow Bend Stud Poultry Farm	625	454–459

Class 7.—Black Orpingtons—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	180	468
Willow Bend Stud Poultry Farm	162	466
Willow Bend Stud Poultry Farm	441	466–468

Class 8.—Rhode Island Reds—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	127	470
Willow Bend Stud Poultry Farm	123	471
Trios—		
Willow Bend Stud Poultry Farm	350	469–471
Willow Bend Stud Poultry Farm	260	472–474
Teams—		
Willow Bend Stud Poultry Farm	610	469–474

SECTION III.—WET MASH.

Class 9.—Any Breed—27 birds competing.
(Home Project Utility Section.)

Name. School. Breed.		
Anthony Rix, Williamstown, White Leghorn	194	478
Warren Hannaford, Paracombe, White Leghorn	186	486
Stanley Pratt, Abattoirs, White Leghorn	179	477
Malcolm Booth, Bridgewater, Black Orpington	179	497

Seed Wheat from Crop Competitions, 1936-37

In Wheat Crop Competitions conducted in the undermentioned districts the following competitors exhibited crops which, in the opinion of the judge at the time of inspection, should produce grain suitable for seed purposes:—

ALFRED.

Competitor and Address. Varieties.

A. A. Marsh, Meribah—Sword, Ranee 4H.
Auricht Bros., Taldra—Sword, Ranee 4H.
J. C. Auricht, Taldra—Nabawa.
G. J. Zimmermann, Meribah—Baringa, Nabawa.
A. C. Webb, Paruna—Sword, Baringa.
E. M. Edwards, Paruna—Ranee 4H, Sword.
P. Paull, Alawoona—Ranee 4H.
A. E. Obst, Ingalta—Nabawa.
A. W. Traeger, Loxton—Baringa.
R. E. Thiele, Loxton—Bencubbin.
D. & H. Kretschmer, Paruna—Sword.
G. E. Hyde, Paruna—Nabawa.
N. W. Zimmermann, Meribah—Nabawa

CENTRAL.

E. W. Day, Reeves Plains—Sword.

BALAKLAVA.

A. N. & H. Freebairn, Owen—Ford, Sword.
Sorrell Bros., Barabba—Ford, Sword.
Bowyer Bros., Owen—Sword.
A. G. Roberts, Barabba—Sword.
J. D. Campbell, Barabba—Sword.
G. Uppill, Balaklava—Caird.
Harkness Bros., Owen—Ford and Sword.
D. J. Wilson, Barabba—Sword.
J. A. Campbell, Stockyard Creek—Ford.

FAR NORTHERN.

E. H. Hampel, Terka—Sword.
J. J. Modystach, Wilmington—Sword.
W. G. Gregurke, Wepowie—Dundee, Ranee 4H, Felix, Merridin.
E. H. Schulz, Terka—Sword.
T. F. Orrock, Wepowie—Ranee 4H.

ALBERT.

J. W. G. Mann, Mindarie—Sword, Dundee.
E. A. Kroehn, Nildottie—Bencubbin.
A. W. G. Grant, Sandalwood—Sword.

LeHUNTE.

P. P. Cook, Mount Dampier—Ford, Sword.
S. C. Billinghurst, Minnipa—Ranee 4H, Sultan.
A. J. Shepherd, Wudinna—Ford.

WAY.

L. Martin, Maltee—Quality.
P. S. Morrison, Waranda—Felix.
A. E. Howlett, Goode—Ford.

SOUTHERN.

C. Baensch, Tepko—Sword.
A. R. Paech, Tepko—Sword.
B. A. Zadow, Tepko—Dundee.
C. S. E. Paech, Tepko—Bencubbin.
E. A. Paech, Palmer—Sword.
L. H. Wachtel, Palmer—Sword.
B. R. W. Lindner, Palmer—Dundee.
L. M. Eichler, Mannum—Sword.
N. W. Borman, Millendilla—Pine Head.
S. A. Bretag, Mannum—Sword.

SOUTHERN—*continued.*

Competitor and Address. Varieties.

Rankine Bros., Strathalbyn—Ranee, Baringa.
Geo. Cross, Belvidere—Sword.
H. H. Cross, Woodchester—Ford.
Mrs. L. S. Jaensch, Hartley—Ranee.
A. B. Jaensch, Hartley—Nabawa.
C. A. Whittlesea, Langhorne's Creek—Sword.
C. F. Altmann, Monarto South—Ranee, Sword.
Thomas Bros., Monarto South—Sword.
E. E. Liebelt, Monarto South—Sword.
J. Hartmann, Monarto South—Dundee.
P. B. Frahn, Monarto—Dundee, Sword.
H. A. Hein, Pallamana—Sword, Dundee, Ranee.
Hugo Paech, Rockleigh—Bencubbin.

TATIARA.

H. C. M. Pilgrim, Wolseley—Dundee.
Fisher Bros., Bordertown—Dundee, Ranee 4H.
E. W. Sharrad, Wolseley—Dundee, Ranee 4H, Barunga.
Menzie & Klien, Mundalla—Ranee 4H.
H. L. Hinge, Mundalla—Totadgin.
A. E. & E. B. Milne, Bordertown—Bencubbin.

BUXTON.

H. A. Cant, Kimba—Waratah.
C. G. & G. W. Cant, Kimba—Waratah.
C. R. Clements, Kimba—Waratah.

NORTHERN YORKE PENINSULA.

J. H. Robertson, Arthurton—Ranee 4H.
J. S. Henderson, Maitland—Ford.
G. E. & H. M. Meier, Paskeville—Sword.
M. C. Bussenschutt, Paskeville—Sword.
O. D. Jericho, Arthurton—Ford.
G. E. Rodda, Thrington—Ranee 4H.
Gardner Bros., Paskeville—Geeralying, Dundee.
L. R. Price, Paskeville—Bencubbin.
W. A. Harris, Thrington—Waratah.
C. Rodda, Thrington—Dundee.
N. J. Cross, Kadina—Dundee.

JERVOIS.

A. Spriggs, Cleve—Sword.
H. Rodda, Mangalo—Ranee.
J. C. Sims, Cleve—Ranee.

SOUTHERN YORKE PENINSULA.

H. Polkinghorne, Minlaton—Sword.
H. H. Glazbrook, Minlaton—Sword.
Alderman Bros., Minlaton—Ford, Sword.
E. H. Giles, Yorketown—Dundee, Baringa, Sword.
H. McBurney, Curramulka—Ranee 4H, Bobbin.
R. Page, Minlaton—Ford, Sword.
H. Lister, Minlaton—Sword.
L. W. Williams, Minlaton—Sword.
M. E. Correll, Minlaton—Ford.

CHANDOS.

J. T. W. Werner, Lameroo—Sword.
W. H. Cabot, Parrakie—Sword.
J. H. & C. H. Spratt, Lameroo—Sword, Ranee 4H.
J. L. Koch, Lameroo—Sword.

NORTHERN.

Competitor and Address.	Varieties.
A. M. Mahood, Wirrabara	Ranee 4H.
Blieschke Bros., Murraytown	Ranee 4H.
P. L. Blesing & R. E. Woolford, Bangor	Baringa, Dundee.
H. K. Moore, Jamestown	Ranee 4H.
W. F. Wurst, Laura	Dundee.
J. C. Kleinig, Laura	Dundee, Nabawa.
J. W. Prior, Gladstone	Ranee 4H.
M. Holland, Caltowie	Sword, Dundee.
J. E. Lehmann, Caltowie	Bencubbin.
A. Crossman, Caltowie	Bencubbin.

MIDLANDS.

Competitor and Address.	Varieties.
D. L. Clarke, Tarlee	Sword.
J. & D. Kelly, Giles's Corner	Dundee.
G. Hazel, Kapunda	Dundee.
W. J. Holding, Eudunda	Dundee.
W. E. Hansen, Eudunda	Dundee.
P. J. Scholz, Eudunda	Sword.
C. Behn & Sons, Riverton	Dundee, Ranee, Carrabin, Waratah.
S. H. Kelly, Riverton	Dundee.
F. Coleman, Saddleworth	Waratah.
E. J. Williams, Tothill's Creek	Ranee.
H. Thomas, Manoora	Gallipoli.
Theo. Vogt, Saddleworth	Dundee.
H. H. Bulbeck, Hilltown	Dundee.
L. J. Harvey, Hilltown	Dundee.
E. V. H. Wilsdon, Andrews	Dundee.
R. F. Thomas, Hallett	Gallipoli.

MIDLANDS—*continued.*

Competitor and Address.	Varieties.
Gask Bros., Gum Creek, Kooringa	Dan.
L. A. Martin, Farrell's Flat	Dundee.
R. R. Bartholomaeus, Farrell's Flat	Dundee.
J. H. Torr, Farrell's Flat	Dundee.
G. T. Przibilla, Farrell's Flat	Dundee.
H. Miller, Farrell's Flat	Dundee.
S. Garrard, Merildin	Dundee.
J. Ross, Martindale Estate, Mintaro	Ghurka.
W. R. Woods & Sons, Mintaro	Dundee.

MID-NORTHERN.

Competitor and Address.	Varieties.
W. P. R. Simon, Halbury	Sword.
A. Maitland, Rochester	Nabawa.
F. J. Pedler, Koolunga	Dundee.
H. S. & O. S. Freeman, Koolunga	Currawa.
Spencer Bros., Koolunga	Ranee 4H.
M. Smart & Son, Gulnare	Bencubbin.

FLINDERS.

Competitor and Address.	Varieties.
W. H. Watkins, Yeelanna	Late Gluyas.
G. J. Cooper, Tumby Bay	Waratah.
R. R. Wilson, Yeelanna	Ford.
G. & A. Lawrie, Ungarra	Ford.
L. Modra, Yeelanna	Sword.
Myer Bros., Mount Hope	Ranee.

OATS.

CENTRAL.

Competitor and Address.	Varieties.
E. W. Day, Reeves Plains	New Zealand Cape.

Results of Wheat Crop Competitions, 1935-36

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total
		Maxima—	35	25	20	15	5	100
	TATIARA.							
	Judged by E. S. Alcock, District Agricultural Adviser.							
1	H. C. M. Pilgrim, Wolseley	Dundee, Ghurka	34	23	19	14½	4½	95
2	J. T. Buckley, Wolseley	Ghurka	35	22	19	14½	3	93½
3	H. L. Hinge, Mundalla	Totadgin	33	24½	18½	14	3	93
4	J. E. McDonald, Bordertown	Ghurka	35	22	18½	13½	3½	92½
5	E. W. Sharrad, Wolseley	Ranee 4H, Dundee	34	23	18	14	3	92
6	Fisher Bros., Bordertown	Ranee 4H, Dundee	32	23	18	14½	4	91½
7	H. C. M. Pilgrim, Wolseley	Gallipoli (two entries)	35	22	16	14	4	91
9	E. W. Sharrad, Wolseley	Baringa, Ghurka	32	22	18½	14	3½	90
10	H. C. M. Pilgrim, Wolseley	Ghurka	32	22	18	14	3½	89½
11	A. E. and E. B. Milne, Bordertown	Bencubbin	30	24	18	13½	3½	89
11	R. A. Grosser, Wolseley	Ghurka and Gallipoli	34	22	16	13	4	89
13	E. L. Milne, Mundalla	Gallipoli	34	22	16	13	3	88
14	Menzie and Klien, Mundalla	Ranee 4H	32	22	17	13	3	87
14	D. R. Milne, Bordertown	Ranee 4H	32	21	18	13	3	87

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds	Freedom from Disease.	Trueness to Type	Evenness of Crop.	Total.
		Maxima	35	25	20	15	5	100

MIDLANDS.

Judged by R. HILL, District Agricultural Adviser

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds	Freedom from Disease.	Trueness to Type	Evenness of Crop.	Total.
1	E. V. H. Wilsdon, Andrews	Dundee ...	35	21	19	14½	4½	94
2	W. R. Woods & Sons, Mintaro ...	Dundee	35	21	18	14½	4¾	93¼
3	P. McD. Smyth, Salter's Springs ..	Dundee, Ford	35	22	17	14	4½	92½
4	H. Bulbeck, Hilltown	Dundee .	32	22	19	14	5	92
5	C. Behn & Son, Riverton	Dundee, Ranee	35	20	18	14	4½	91½
	J. Ross, Martindale Estate, Mintaro	Ghurka .	33	21	20	14½	3	91½
	S. H. Kelly, Riverton..	Dundee .	34	21	18	14	4½	91½
	P. McD. Smyth, Salter's Springs ..	Sword, Ford	35	20	17	14½	5	91½
9	C. P. and H. H. Overton, Salter's Springs	Dundee	33	22	18	13	5	91
	L. J. Harvey, Hilltown	Dundee	32	21	19	14½	4½	91
11	G. P. Przibilla, Farrell's Flat	Dundee ...	32	21	19	14½	4	90½
	A. M. Ross, Alma	Dan	33	22	19	12	4½	90½
13	L. A. Martin, Farrell's Flat	Dundee ..	31	21	19	14½	4½	90
14	C. Lake, Alma	Sword	35	20	17	13	4¼	89¼
	G. Hazel, Kapunda....	Dundee, Ranee	30	23	18	14	4¾	89¾
16	A. Mitchell, Mintaro	Ranee	34	21	17	13	4½	89½
	Mrs. E. Glynn, Rhyne...........	Dan	32	23½	17	13	4	89½
18	J. Ross, Martindale Estate, Mintaro	Ranee, Gallipoli	35	20	17	12½	4¾	89¼
19	Gask Bros., Gum Creek, Kooringa	Dundee	31	24	18	12	4	89
20	S. Garrard, Merildin	Dundee	29	22	19	13½	4½	88
	A. J. Jones, Manoora	Gallipoli .. .	33	21	17	13	4	88
	J. H. Torr, Farrell's Flat	Dundee	28	21	20	14½	4½	88
23	W. B. Hendry, Manoora	Gallipoli	29	23	18	13	4	87
24	R. R. Bartholomaeus, Farrell's Flat	Dundee ..	30	20	18	14½	4	86½
	E. V. H. Wilsdon, Andrews	Dan	31	22	16	13½	4	86½
26	H. W. Player, Gum Creek	S.H.J.	26	24	20	12	4	86
	W. J. Cornwell, Hilltown	Sword	28	24	16	14	4	86
28	H. Thomas, Manoora	Gallipoli .. .	27	22	19	14	3¾	85¾
29	E. J. Williams, Tothill's Creek ...	Ranee	28	20	18	15	4½	85½
	Gask Bros., Gum Creek, Kooringa	Dan	25	24	19	14½	3	85½
31	F. Coleman, Saddleworth	Ghurka	29	20	18	14	4	85
	J. and D. Kelly, Giles' Corner	Dundee	29	21	17	14	4	85
33	W. E. Hansen, Eudunda	Dundee, Ranee	30	21	17	12½	4	84½
	Theo. Vogt, Saddleworth	Dundee	28	20	17½	14½	4½	84½
	E. V. H. Wilsdon, Andrews	Dan	32	20	16	12½	4	84½
36	H. Schunke, Manoora............	Gallipoli	28	21	18	13	4	84
	E. Finch, Burra................ .	Ranee	26	23	18	12½	4½	84
	H. Miller, Farrell's Flat	Dundee	25	21	20	14	4	84
	B. Y. Freebairn, Alma	Sword	28	20	17	14½	4½	84
40	W. J. Holding, Eudunda	Dundee, Ranee	28	21	17	13½	4	83½
	R. Roebuck, Eudunda	Mogul, Ranee	28	22	17	12½	4	83½
	E. J. Williams, Tothill's Creek ...	Ranee	26	20	18	15	4½	83½
	P. J. Scholz, Eudunda	Sword, Ranee	27	21	18	13½	3½	83

Results of Wheat Crop Competitions—continued.

Position	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

MIDLANDS—continued.

Position	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
44	Allen Day, Alma	Sword	30	20	16	12	4½	82½
45	E. A. Rhode, Hamilton	Clarence, Sword, Ranee	28	20	18	12	4	82
	R. F. Thomas, Hallett	Gallipoli	22	23	18	14½	4½	82
	H. A. Davis & Sons, Riverton	Dundee	28	18	19	13	4	82
48	B. J. McInerney, Riverton	Dundee	28	20	17	12½	4	81½
	R. F. Thomas, Hallett	Ghurka	22	22	18	15	4½	81½
	W. E. Blachford, Mintaro	Dundee	28	18	18	14	3½	81½
	R. F. Kelly, Manoora	Dundee, Ghurka, Gallipoli	25	23	18	12	3½	81½
52	H. G. Allen, Auburn	Ranee	28	20	17	12	4	81
53	S. Garrard, Merildin	Gallipoli	27	21	16	12½	4	80½
54	J. Kildea, Hansborough	Ranee	22	23	17	14	4	80
55	H. W. Player, Gum Creek	Dan, Turvey	22	23	18	13	3½	79½
56	D. L. Clarke, Tarlee	Sword, Dundee	24	20	17	14	3½	78½
	Molineux Bros., Tarlee	Sword	28	18	17	12	3½	78½
	T. A. Freebairn, Alma	Sword	27	19	16	12½	4	78½
59	H. W. Brown, Alma	Sword	22	20	16	14	4½	76½
	J. S. Lake, Alma	Ford, Ranee	26	18	17	12	3½	76½
61	Robt. McKenzie, Alma	Sword	20	20	16	14½	4½	75

FLINDERS.

Judged by H. D. Adams, District Agricultural Adviser.

Position	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	W. H. Watkins, Yeelanna	Late Gluyas	35	24½	19½	14	4	97
2	G. J. Cooper, Tumby Bay	Waratah	33	24	19½	14½	4½	95½
3	H. O. Clements, Yeelanna	Ford	34	24½	19½	13	4	95
4	R. R. Wilson, Yeelanna	Ford	32	24½	19½	14	4½	94½
5	G. and A. Lawrie, Ungarra	Ford	31	24½	19½	14	4	93
	L. Modra, Yeelanna	Sword	33	23½	18½	14	4	93
	T. Gardner, Yeelanna	Ford	33	24	19	13	4	93
	Darmody Bros., Pillana	Ranee	32	24	19	13½	4½	93
	H. Glover, Yeelanna	Sword	32	24½	19	13½	4	93
10	W. H. Watkins, Yeelanna	Ranee	32	24	18	13½	4½	92
11	Smith Bros., Yeelanna	Ford	32	23½	18½	13½	4	91½
12	Palm Bros., Pillana	Major, Ford	31	23½	18½	13½	4	90½
	V. Fitzgerald, Cummins	Sword	30	24	19	13½	4	90½
	H. T. Pedler, Ungarra	Ford	31	23½	18½	13½	4	90½
15	P. H. Wagner, Brimpton Lake	Ford	27	24	19½	13½	4	88
16	Myer Bros., Mount Hope	Ranee	26	23½	19	14	4½	87
	M. Aikenhead, Brimpton Lake	Nabawa	26	24	19	13½	4½	87
	W. Treasure, Ungarra	Gluyas	26	24	19½	13	4½	87
19	W. Wemyss, Yeelanna	Gresley	26	24	17½	13½	4	85
	J. Meaney, Brimpton Lake	Gluyas	26	23	19	13	4	85
21	A. J. and W. F. Vigar, Mount Hope	Queen Fan, Late Gluyas	25	23	18½	13½	4	84
22	G. P. Dodd, Brimpton Lake	Sword, Nabawa	22	24½	19½	13½	3½	83
	J. Schramm, Ungarra	Dundee	23	23	19½	13½	4	83
24	A. C. Baillie, Lipson	Sword, Nuggett	24	22½	17½	13½	3½	81
	J. H. Clothier, Brimpton Lake	Currawa	21	24	19½	13	3½	81

Advisory Board.

The monthly meeting of the Advisory Board of Agriculture was held on 25th November, there being present:—Messrs. J. Wallace Sandford (Vice-Chairman), A. M. Dawkins, S. Shepherd, A. J. A. Koch, F. Coleman, J. B. Murdoch, Prof. A. J. Perkins, W. J. Spafford (Director of Agriculture), Dr. A. E. V. Richardson (Director, Waite Research Institute), and H. C. Pritchard (Secretary). Apologies were received from Hon. A. L. McEwin, M.L.C., Messrs. H. N. Wicks, G. Jeffrey, and R. H. Martin.

Leave of Absence.—The Secretary was instructed to request Ministerial approval for six months' leave of absence on behalf of Mr. J. Wallace Sandford.

Life Members.—The honour of Life Membership was conferred on the following members:—Messrs. E. P. Wall, W. H. Shepherd, F. V. Dinon, C. I. Phillis (Eurelia), W. A. Clifford (Penola), W. E. Stone, G. P. Roberts (Petina), F. Lewis, R. Stanley (Ramco), and G. Major (Millicent).

New Branches.—Approval was given for the formation of Branches of the Agricultural Bureau at Willowie (Women's) and Murraminga, with the following Foundation Members:—Willowie Women's—Mesdames L. N. Mills, E. C. Foulis, H. T. Hughes, R. Jared, W. P. Foulis, A. Crisp, H. K. Gum, S. T. McCallum, and Misses R. McCallum, E. Batten, G. Gum, and M. Mountford. Murraminga—Messrs. F. Roberts, L. Dale, F. Holmes, W. H. Tremaine, H. J. Jones, J. Battams, W. Kies, A Murray, J. Parmentier, J. S. Hunt, J. Tremaine, and N. Bates.

Conditional approval was granted for Branches to be formed at Alawoona (Women's) and Wirreanda.

Branches to be Closed.—It was decided to close the Langhorne's Creek and Glossop Branches.

New Members.—The following names were added to the rolls of existing Branches:—Balhannah Women's—Mrs. J. Thiele, Mrs. J. Clark; Barmera—T. H. Taylor; Beetaloo Valley—A. Matthews; Belalie Women's—Mrs. Herb. Medlin, Mrs. A. D. Mitchell; Belvidere—E. R. S. Maidment, A. J. Quinn; Blackheath—A. R. Paech; Blewitt Springs—L. Brunato; Bute—Eric J. Commons, J. G. Commons, N. C. Commons, H. E. W. Sluggett, E. V. Harris, T. W. Read, E. J. Ebsary, J. W. Chase; Coonalpyn—David Lang, Cyril Tiller; Coonalpyn Women's—Miss A. Burtt, Mrs. D. Lang, Miss M. Todd; Coonawarra Women's—Miss D. Pounsett, Miss A. Webber, Miss L. Teichelman, Miss K. Teichelman, Miss W. Soper; Currency Creek—Allan D. Parsons; Echunga Women's—Mrs. E. W. Perry, Mrs. C. T. Rodger, Mrs. M. Powell, Mrs. H. E. Berry; Frayville—N. W. Bormann; Gawler River—J. L. Read; Goode—E. M. Goldsmith, W. Lange, T. W. Tiggeman; Jervois—F. Chamberlain; Kyancutta—Clark, Little, Walter McGuinness; Kybybolite—J. Wytkin, Clive Ritchards; Laura Bay—A. B. Hoffrichter; Lenswood and Forest Range—H. Plummer, Jeff. Cranwell; Lipson—M. Beaty; Mangalo Women's—Miss N. Burns; McLaren Flat—W. Maidment, A. Lush; Meadows—H. F. Hodgeman; Milang—W. H. A. Cockrane; Miltalie—Eric Jacobs; Monarto South—Lawrence Frahn, Clarence Frahn; Mount Barker—L. Zilm, — Disher, H. Hansen; Mount Compass—Nitschke; Myponga Women's—Miss R. Oldfield; Parrakie—F. Nicholls, B. Coady; Pinbong Women's—Mrs. H. Hissey, Miss P. Hissey; Pinkawillinie—J. C. Kilburn, P. J. Rohrlach; Ramco—Brooklyn Darling; Riverton—Kenneth Bruce; Scott's Bottom—Allan Davis; Sheoak Log Women's—Mrs. Daly; Truro—R. W. Scholz; Warramboo—E. B. Kane; Wasleys Women's—Mrs. P. Carey, Miss A. Carey, Mrs. H. H. Hancock, Miss S. Lyons, Miss M. Oliver, Mrs. R. George; Williamstown—Colin Baird, Harold Patterson; Wilmington—Tom Cornelius; Wirrabara—R. Schaefer, F. W. Edwards, C. A. Jaeschke, W. J. Thomson, L. Stevens, and H. W. Hunt.

Number of Branches.—347.

Number of Members.—5,941.

Several items were taken in Committee.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of December, 1936; also the average precipitation for December, and the average annual rainfall.

FAR NORTH AND UPPER NORTH.

Station.	For Dec., 1936.	Av'ge. for Dec.	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
Oodnadatta ..	0·27	0·45	4·10	4·60
Marree	0·90	0·72	4·55	5·80
Farina	0·53	0·57	4·21	6·37
Copley	0·76	0·74	5·23	7·76
Beltana.......	0·77	0·79	5·72	8·39
Blinman	1·00	0·89	6·75	11·71
Hookina	0·48	1·05	8·38	10·94
Hawker	0·18	1·05	8·90	12·09
Wilson	1·06	0·90	10·59	11·65
Gordon	0·66	0·88	7·19	10·33
Quorn	0·89	0·79	8·56	13·10
Port Augusta..	0·69	0·59	7·72	9·40
Bruce	1·22	0·85	11·34	9·74
Hammond	1·61	0·84	9·91	11·05
Wilmington ..	1·57	0·89	16·56	17·18
Willowie	1·67	0·85	10·25	12·10
Melrose	2·78	1·03	22·22	22·80
Booleroo Centre	1·45	0·97	12·18	15·14
Port Germein .	2·30	0·81	11·03	12·51
Wirrabara	1·90	1·01	14·08	19·22
Appila........	1·59	0·98	12·03	14·59
Cradock	0·73	0·88	8·05	10·67
Carrieton	0·71	0·98	9·39	12·11
Johnburg	0·88	0·93	9·39	10·49
Eurelia	0·96	0·88	10·18	12·66
Orroroo.......	1·15	0·84	11·59	13·12
Nackara	0·86	0·92	11·50	11·09
Black Rock ...	1·15	0·84	10·72	12·26
Oodlawirra ...	0·94	1·18	11·76	11·34
Peterborough..	1·04	1·00	11·25	13·14
Yongala	1·18	1·05	13·90	14·37

NORTH-EAST

Station.	For Dec., 1936.	Av'ge. for Dec.	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
Yunta	1·28	0·72	8·37	8·44
Waukaringa ..	2·00	0·67	9·16	7·82
Mannahill	1·07	0·72	6·86	8·08
Cockburn	1·59	0·63	9·48	7·81
Broken Hill ..	1·09	0·79	8·20	9·40

LOWER NORTH.

Station.	For Dec., 1936.	Av'ge. for Dec.	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
Port Pirie	1·57	0·78	12·01	13·18
Port Broughton	1·88	0·67	11·46	13·87
Bute	0·97	0·72	12·50	15·42
Laura	1·55	0·89	14·69	17·93
Caltowie	1·88	0·96	13·31	16·69
Jamestown....	2·05	1·07	14·88	17·68
Gladstone	1·81	0·88	12·39	16·31
Crystal Brook .	1·69	0·89	12·21	15·79
Georgetown ..	1·70	0·97	13·85	18·24
Narridy	1·39	0·87	10·97	15·74
Redhill	1·83	0·85	15·81	16·55
Spalding	1·12	1·17	12·85	18·68
Gulnare	1·74	1·03	13·95	18·51
Yacka	1·46	0·91	13·17	15·38
Koolunga	1·06	0·93	11·26	15·29
Snowtown	1·26	0·77	14·58	15·69

LOWER NORTH—*continued.*

Station.	For Dec., 1936.	Av'ge. for Dec..	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
Brinkworth	0·95	0·91	11·16	15·72
Blyth	0·71	0·93	14·20	16·73
Clare	1·85	1·14	23·37	24·43
Mintaro	2·42	1·16	21·55	23·30
Watervale	1·87	1·28	25·23	26·69
Auburn	1·51	1·07	21·44	23·92
Hoyleton	1·41	0·87	17·61	17·25
Balaklava.......	0·93	0·81	11·67	15·41
Port Wakefield ..	1·12	0·63	11·18	12·93
Terowie	1·13	1·03	14·02	13·27
Whyte-Yarcowie	1·47	0·87	14·35	13·54
Hallett	2·02	1·00	14·92	16·39
Mount Bryan....	2·49	1·02	16·10	16·76
Kooringa	1·41	0·96	15·33	17·78
Farrell's Flat ...	1·37	0·98	17·86	18·52

WEST OF MURRAY RANGE.

Station.	For Dec., 1936.	Av'ge. for Dec..	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
Manoora	1·62	1·08	17·03	18·91
Saddleworth	1·58	0·99	20·93	19·56
Marrabel........	1·73	0·98	19·20	19·91
Riverton........	1·98	0·95	20·96	20·79
Tarlee	2·50	0·94	18·21	18·06
Stockport	2·82	0·93	17·89	17·02
Hamley Bridge .	2·33	0·92	15·41	16·52
Kapunda	2·02	1·01	17·98	19·74
Freeling	1·95	0·92	14·60	17·79
Greenock	2·16	1·07	18·92	21·47
Truro	3·07	0·91	18·04	19·75
Stockwell	2·39	1·01	18·08	20·02
Nuriootpa	3·87	1·09	22·02	20·74
Angaston	2·62	1·07	20·54	22·33
Tanunda........	2·51	0·99	19·88	21·97
Lyndoch	2·20	1·01	17·65	23·28
Williamstown ...	2·27	1·07	20·19	27·54

ADELAIDE PLAINS.

Station.	For Dec., 1936.	Av'ge. for Dec..	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
Owen	1·43	0·67	15·38	14·78
Mallala	2·10	0·85	14·14	16·43
Roseworthy	1·74	0·84	14·25	17·43
Gawler	2·45	0·88	15·50	18·85
Two Wells	2·05	0·83	12·79	15·80
Virginia	2·00	0·91	14·63	17·22
Smithfield	2·30	0·88	15·28	17·68
Salisbury	2·62	0·87	14·52	18·55
Adelaide	3·42	1·00	19·34	21·17
Glen Osmond....	1·83	1·17	20·37	25·97
Magill	2·83	1·22	19·99	25·36

MOUNT LOFTY RANGES.

Station.	For Dec., 1936.	Av'ge. for Dec..	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
Teatree Gully ...	2·99	1·26	19·15	27·03
Stirling West ...	3·01	1·84	38·97	47·01
Uraidla	3·83	1·74	34·96	43·83
Clarendon.......	2·66	1·38	28·14	32·81
Happy Val'y Res.	2·19	—	21·28	—
Morphett Vale ..	2·73	0·96	19·77	22·62
Noarlunga	3·40	0·77	20·34	20·35
Willunga	2·08	0·91	22·14	25·96
Aldinga.........	1·52	0·80	16·03	20·21

RAINFALL—*continued.*

Station.	For Dec., 1986.	Av'ge. for Dec.	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	1·44	1·06	22·99	29·72
Inman Valley .	1·50	—	24·76	—
Yankalilla	1·57	—	19·08	22·78
Mount Compass	1·74	1·30	27·99	36·25
Mount Pleasant	1·84	1·05	23·49	27·08
Birdwood	1·78	1·18	21·38	29·02
Gumeracha ...	1·95	1·34	22·35	33·28
Millbrook Res..	2·32	1·56	24·13	34·50
Lobethal	2·76	1·36	28·28	35·94
Woodside	2·19	1·25	24·39	32·16
Hahndorf	1·97	1·36	26·17	34·82
Nairne	1·77	1·15	23·05	28·14
Mount Barker	2·40	1·26	25·59	31·24
Echunga	2·65	1·28	30·37	33·30
Macclesfield ..	2·12	1·21	26·45	30·37
Meadows	3·06	1·37	31·65	36·02
Strathalbyn ..	2·80	0·86	20·16	19 34
MURRAY FLATS AND VALLEY.				
Meningie......	0·88	0 80	16·94	18·29
Milang	1·53	0·69	15·05	14·85
Langhorne's Ck	2·79	0 80	17·80	14·93
Wellington ...	1·59	0·79	15·86	14·66
Tailem Bend ..	3·05	0·92	18·27	15·07
Murray Bridge	2·04	0 76	14·54	13·49
Callington	2 26	0·80	14·98	15·14
Mannum	2·08	0·62	12·80	11·49
Palmer	2·39	0·82	18·28	15·63
Sedan	1·39	0·63	10·67	12·01
Swan Reach...	1·05	0·71	9·94	10·62
Blanchetown ..	2·70	0·71	12·04	10 95
Eudunda	2·30	0·94	18·69	17·13
Point Pass ...	2·79	0·89	20·63	16·66
Sutherlands ..	1·58	0·70	11·29	10·71
Morgan	2·32	0·75	9·96	9·10
Waikerie......	3·14	0·74	14·11	9·59
Overland Corner	2·13	0 76	11·76	10·18
Loxton	1·22	0·79	11·32	11·34
Berri	1·58	0·85	11·81	10·03
Renmark	0·82	0·78	11·92	10·33
WEST OF SPENCER'S GULF.				
Eucla	0·36	0·50	8·52	10·08
Nullarbor	0·10	0·41	4·87	8·87
Fowler's Bay .	0·79	0·31	9·42	11·93
Penong	0·84	0·47	10·27	12·28
Koonibba	1·48	0·52	11·59	12·18
Denial Bay ...	0·91	0·37	11·01	11·33
Ceduna	0·91	0·41	9·62	10·32
Smoky Bay ...	0·71	0·42	8·67	10·50
Wirrulla	1·22	0·43	8·56	10·87
Streaky Bay ..	0·88	0·41	11·29	14·91
Chandada	1·59	0·28	9·83	12·66
Minnipa	0·91	0·59	10·96	13·97
Kyancutta ...	1·57	0·36	11·42	13 45
Talia	0·65	0·57	10·62	14·76
Port Elliston .	0·49	0·49	11·84	16·53
Lock	1·26	0·74	11·99	16·44
Mount Hope ..	0·60	—	13·67	—
Yeelanna	0·78	0·52	11·73	16·11
Cummins	0·43	0·58	12·53	17·70
Port Lincoln..	0·87	0·68	14·18	19·35
Tumby	0 57	0·73	10·52	14·29
Ungarra	0·81	0·73	13·40	16·94
Port Neil	0·52	0·74	10·20	13·16

Station.	For Dec., 1936.	Av'ge. for Dec.	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
WEST OF SPENCERS GULF—*continued.*				
Arno Bay	1·16	0·63	9 95	12·82
Rudall	1·05	0·49	9·74	13·23
Cleve	1·03	0·68	11·81	14·96
Cowell	0·86	0·52	10·97	11·06
Miltalie	0·96	0·61	12·34	13·75
Mangalo	0·92	0·63	11·87	13·86
Darke's Peak ...	1·21	0·75	11·67	15·24
Kimba	0·91	0·50	8·59	11·84
YORKE PENINSULA.				
Wallaroo	1·61	0·59	11 42	13·97
Kadina	1·46	0·66	11·85	15·59
Moonta	1·46	0·67	11·16	15·04
Paskeville.......	3·16	0·67	17·03	15·44
Maitland........	1·28	0·77	13·78	19·86
Ardrossan.......	0·90	0·57	10·86	13·96
Port Victoria ...	0·95	0·68	11·75	15·39
Curramulka	0 66	0·73	13·33	17·81
Minlaton........	0·85	0·63	13·44	17·72
Port Vincent ...	0 69	0·67	10·56	14·37
Brentwood	0·87	0·61	12·35	15·61
Stansbury	0·97	0 60	13·40	16·81
Warooka	0·75	0·54	13·67	17·44
Yorketown	0·70	0·60	12·55	16·88
Edithburgh	0·65	0·61	12·10	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	1·35	0·77	22·68	24·87
Kingscote	0·75	0·73	15·14	19·27
Penneshaw	1·07	0·80	17·01	19·18
Victor Harbour .	1·26	0 87	17·84	21·43
Port Elliot	1·72	0·84	19 02	19·94
Goolwa	1·14	0·77	18·22	17·84
Maggea	2·29	0·71	13·26	10 02
Copeville	1·63	0·82	14·66	11·51
Claypans	1·59	0·87	12·97	10·53
Meribah	1·64	0·73	13·40	11·11
Alawoona	1·59	0·67	12·81	10 26
Caliph	1·49	0·44	11·58	10·44
Mindarie	1·84	0·79	12·72	12·13
Sandalwood	1 69	0·89	15·16	13·60
Karoonda	3·72	0·92	17·15	14 18
Pinnaroo	0·89	0·82	12·62	14 19
Parilla..........	1·36	0·76	14·23	13·64
Lameroo	1·71	0·91	15·74	15·79
Parrakie	1·21	0·85	13·44	14·61
Geranium	1·31	0·98	14·35	16·39
Peake	1·64	0·89	13·89	15 95
Cooke's Plains ..	2·09	0·82	16·74	15·29
Coomandook	1·24	0·78	16·36	17·03
Coonalpyn	1·00	0·89	17·65	17 65
Tintinara	1 51	1·02	17·45	18·72
Keith	1·30	0·95	17·74	17·96
Bordertown	3·00	1·01	20·32	19·14
Wolseley........	2·91	0·93	20·12	18·47
Frances.........	5·08	1·16	23·30	20·12
Naracoorte	2·96	1·12	21·45	22·65
Penola	2·15	1 29	22·66	25·94
Lucindale	2·65	1·12	24·28	23·47
Kingston	2·32	1·09	24·07	24·24
Robe	1·35	1·01	23·24	24·65
Beachport	2·19	1·11	26·73	27·07
Millicent	4·14	1·27	33·34	29·87
Kalangadoo	3·75	1·40	31·15	32·05
Mount Gambier.	2·95	1·60	26·86	30·34

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East, 11th November, Address—R. C. Scott, 27th November, Question Box; Appila-Yarrowie, 9th November, Question Box; Beetaloo Valley, 23rd November, "New Zealand"—R. C. Scott; Blackheath, 3rd December, Paper from *Journal*; Blewitt Springs, 1st December, Congress Report; Blyth, 27th November, "Sand-drift"—L. C. Mugge; Brentwood, 26th November; Coonalpyn, 25th November, Discussion; Hartley, 25th November; Ironbank, 25th November, "Care of Animals"—Mr. Harvey; Kilkerran, 28th September, "Sheep and Wool"—C. E. Heinrich; Koonunga, "Agricultural High School Course"—A. R. Ninnes; Lenswood and Forest Range, 30th November, Visit from Balhannah Branch; Light's Pass, 23rd November, "Agricultural High School Course"—A. R. Ninnes; MacGillivray, 10th November, Field Day; Marama, 25th November, Congress Reports; McLaren Flat, 18th December, Field Day and Social, 26th November, Papers—K. H. Warren and H. C. Platts; Meadows, 1st December, Discussion; Milang, 7th November, Debate—"Large *v.* Small Holdings"; Millicent, 10th November, "Sheep"—C. A. Goddard; Monarto South, 28th November, "Preparing Seed Wheat"—M. Thomas; Mount Pleasant, 3rd December, "Pink-eye in Sheep"—A. Hicks; Penola, 10th December, Field Day; Penwortham, 30th November, "Currant-growing"—W. H. Penna; Port Elliot, 20th November, "Dehorning Cattle"—H. B. Barlow; Pygery, 27th October, Discussion, 24th November, Question Box; Roberts and Verran, 25th November, "Hay-growing"—B. Crabb; South Kilkerran, 2nd November, "White Ant Extermination"—E. W. Hoffman; Springton, 2nd December, "Agricultural High School Course"—A. R. Ninnes; Weavers, 2nd November, "Seeds"—E. H. Giles; Whitwarta, 2nd November, Congress Reports; Yadnarie, 24th November, "Freezer Lambs"—R. V. Stirling; Yundi, 26th November, "Sheep"—A. S. Kidman.

Hay Growing and Cutting.

[B. Crabb, Roberts and Verran.]

WORKING THE LAND.

Land that in a reasonable season should yield a fair cut of hay is stubble ground previously sown with wheat. First burn off stubble, then cultivate lightly to bury all seed and to let the land sweeten. After the first rain, when weeds are just up, another light working should be given, even if only with a heavy set of harrows; if the weather is fine young weeds are easily checked. Sow as early as possible with a combine, using 1½bush. of oats and 50lbs. of super to the acre. Harrow well, as this helps to pack the soil and levels out ridges. Pick all stumps and stones before the crop is too high; otherwise some are likely to be missed. The harrows knock down small roots that may get in the binder knife.

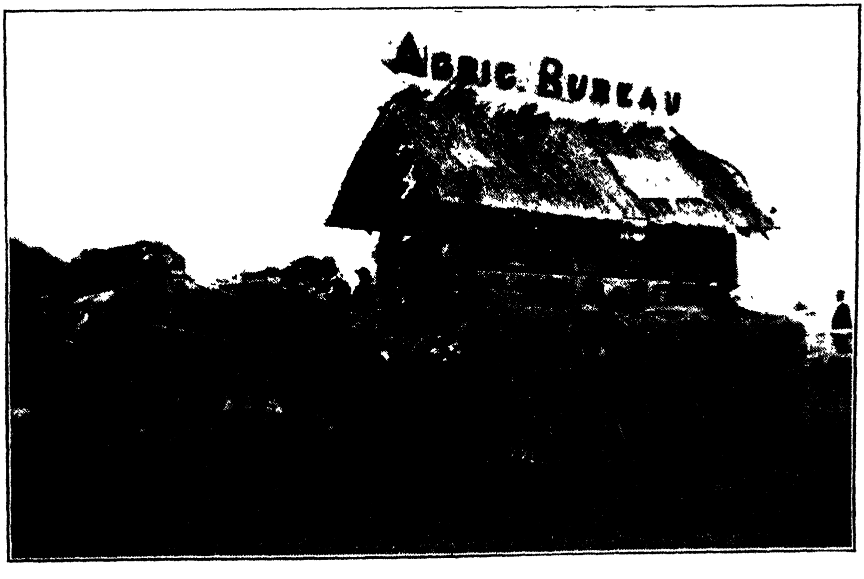
CUTTING.

Before starting the binder be sure to give it a good overhaul. Tighten all nuts, replace all worn parts, and above all, clean all oil holes and see that the oil is getting through properly, as oil is cheaper than spare parts. Start hay cutting when the crop is a bit on the green side, as once oats start to ripen they go off in a few days. Hay should be stooked right up behind the binder, as it seems to cure better, and there is less risk of damage by rain.

STACKING.

Stacking can be started as soon as the hay is properly dry; generally about a fortnight is sufficient time. Stack with butts out right through; to a certain extent this prevents mice from getting in. Always keep the middle of the stack higher than the outside; if it should rain before the stack is complete, there will be very little damaged. Before starting to roof, sprinkle sulphur around the outside layer. Sulphur prevents mice from getting in and is also a good condition powder for horses. Roof the stack with butts out, so that sparrows and other birds cannot do so much damage as they will if the roof is roofed with heads out. To find the tonnage of a stack multiply the length by the width then by the height, and divide by 300 for new hay and about 260 for old. Round ends on stacks are easier to build.

Discussion.—Mr. Barber thought a heavier dressing of super necessary, 80lbs. on stubble ground and 1cwt. on fallow. He considered stubble ground was only a chance crop and he would favour fallow wherever possible. The combine, with harrows after, was the better method of seeding. Mr. A. Edwards preferred to make a note of necessary binder repairs when finishing cultivating and put a note in the twine box for next season. Mr. A. Ramsay said the secret of success was in the preparation of the soil, and if everything was thoroughly prepared before seeding a good crop should result, if weather conditions were favourable. He favoured sowing oats and wheat mixed for hay. Mr. A. Crabb favoured building stacks with square corners and all butts out; each layer helped to prevent rain from entering. Mr. R. Crabb said that if sowing oats on stubble ground it was necessary to wait for rain and kill all weeds before sowing. Mr. W. Whittaker agreed with the writer as regards sowing oats on stubble and would sow wheat on fallow and so be assured of cutting hay should the season be dry. The man on the binder was responsible for tying irregular sheaves and should use his adjustments more. In poor crops it would save a lot of hay and loss of time during the stooking and carting. Mr. I. Cowley said other cereals could be cut. Rye and barley made good hay if cut in the right stage. Mr. G. Pedler thought making a note of repairs a good one and would build round-cornered stacks with heads out. Mr. Hope Smith favoured cutting hay on the ripe side, especially oats. He favoured stacking with round corners, and said square corners could be made more secure by bending half of one sheaf and laying the other on top. He would roof all stacks with straw. Mr. C. Masters considered sowing oats on stubble ground was leaving the hay-cut to chance; favoured sowing 10 acres of oats on fallow per working horse. If ground was cleared and conditions favourable there should be no fear of having no hay.



Millicent Agricultural Bureau Decorated Trolley in the local Centenary Celebrations, 28th November, 1936. Awarded First Prize for the Best Industrial Exhibit.

Care of Sheep.

Mr. A. S. Kidman, in an address to the Yundi Branch on 26th November, stated that the country between Cape Jervis and Mount Pleasant was more suitable for sheep grazing than the South-East. Large areas in the South-East were flat, which prevented good drainage. This disadvantage caused foot rot. Also graziers had a long distance to transport their stock to market. In the hilly districts the land was well drained, and as lambing occurred during the rainy season, it was necessary to have high grounds for camping sites. Taking into consideration these advantages, combined with the fact that the country would grow pastures excellently, the speaker anticipated that within ten years the district will carry many times its present number of sheep.

Making of Paddocks.—A paddock with a hill was essential. A 5-wire cyclone fence, with a top wire, was an excellent type.

Type of Suitable Sheep.—A Border Leicester ram crossed with a Merino was an ideal cross for the fat lamb trade.

Water.—Clean water in troughs was preferable to creeks; in the latter sheep were liable to get worms and other diseases from reeds growing in the creks. By adding a little bluestone to the troughs worms would be checked.

Mating.—Two per cent. rams with ewes was suitable for the district, although 4 per cent. was the general ratio on northern stations. It was better to yard ewes, as it prevened injury to the rams. Ewes should be half fat. Very fat ewes yielded a poor percentage and the offspring were miserable owing to little milk.

Marking Lambs.—Marking should be done when lambs were 2 weeks old; at that age the shock was not as great as at 6 or 8 weeks of age. Cleanliness was essential. Kerosene should be applied after the operation. For stud sheep pure veterinary iodine was preferred. It was not advisable to mark on hot days, owing to the blowfly pest.

Preparatory to taking a lamb from the ewe, it was imperative to have very clean hands. After removing the lamb, the ewe should be syringed with Condy's fluid.

Small paddocks were preferred, with rotational grazing. Balance of pasture prevented illnesses such as "Pulpy Kidney."

Field Day on Kangaroo Island.

TOUR OF MACGILLIVRAY DISTRICT.

The MacGillivray Branch held its annual tour of inspection on 10th November. In the morning members motored to the property of Messrs. Shearer, Jacob and Bennett at Cassini to see a demonstration of scrub-rolling with a Diesel Caterpillar tractor and heavy roller. Although some of the trees were nearly 2ft. in circumference, they were satisfactorily rolled. Members thought that most of the scrub on Kangaroo Island could be rolled with a much cheaper tractor.

In the afternoon members met on the property of Mr. E. G. Rymill, where a large area of new land planted with Wimmera Rye Grass and Subterranean Clover was inspected. The rye grass was doing better than the clover, as is usual on poor soil in the first year.

It was noticed that where the rye grass and clover seed had been mixed with the super and left a few days before sowing, the fertiliser had affected the germinating qualities of the rye grass, but not the clover. Thus rye grass should be sown soon after mixing with super.

Some interesting experimental plots were inspected on the property. It was noticeable that sulphate of ammonia on its own was useless as a fertiliser on this type of soil. When used with super the rye grass was certainly stimulated, but it was doubtful if it helped the clover.

The next property visited was that of Mr. J. Wood, where some excellent Subterranean Clover pastures were seen on the flats near the creek.

The property of Seager Bros., "Hawk's Nest," was next visited. Here some experimental plots were inspected with interest. With the plots on new land the results appeared to be very much the same as at Mr. Rymill's property—as regards fertilising with super and ammonia. A fine paddock of rye grass was seen growing on new land, but the clover was not so good. This paddock had been sown with 2cwts. of 1 and 1 super and ammonia per acre.

A small field of Phalaris was noticed growing well near the homesteads. It is intended to harvest it for seed. A flock of Bungaree blood sheep, that had had access to a lick and had been drenched, showed no signs of coast disease and were in splendid condition.

Passing through this property crops of wheat and barley were seen on the way to Mr. D. R. Lade's property, where a splendid field of Subterranean clover was inspected.

Splendid crops and pastures were seen on Mr. R. Wheaton's property. A paddock of good ground sown with lucerne and a mixture of grasses about 9 years ago was a splendid pasture, in spite of heavy stocking all the winter. A large area of new land rolled last year was inspected. This was chiefly sown with 6lbs. Wimmera Rye Grass and 150lbs. super to the acre. A strip of oats appeared to be nearly choked out by the rye grass, showing that 6lbs. of rye grass was too much to sow with oats. A strip of 2lbs. Subterranean Clover with 6lbs. rye grass was also noticed. Part of the clover was poor, but better plants were seen at one end. A splendid crop of Ford wheat growing on fallow was inspected.

At the close of the tour Mr. R. Hill (District Agricultural Adviser) addressed the gathering, dealing with clearing and sowing new pasture land. He considered that King Island Melilot would be more used in the district in future.

The cricket ground near the homestead was inspected. It was sown with Clune's perennial rye grass last year, and topdressed this year, cut early in October for ensilage, then fed off with sheep, and still appeared to be a grass suitable for parts of MacGillivray.

Currant Cultivation.

In an address before the Penwortham Branch, Mr. W. H. Penna stated that after the pruning operations were finished, the first thing to do was to dispose of the canes, in preparation for ploughing, this being done in two different ways:—

(1) By returning the canes to the soil (for manure purposes), by ploughing a deep furrow up the centre of the rows, and laying the cuttings in the furrow sufficiently deep so that they would not inter-

Non-Irrigated Fruitgrowers' Conference, Greenock—Delegates at Seppeltsfield.

fere with ploughing operations. The above procedure was inadvisable in the non-irrigated areas, owing to stony conditions, and also to the shallowness of the clay subsoil.

(2) The speaker referred to the disposal of the canes through the services of the burner, which was a speedy method.

After the disposing of the canes, it was advisable to apply 3cwt. to 4cwt. of 45 per cent. superphosphate per acre, broadcast in May and ploughed in August at a depth of 5in. to 6in.; and later followed by a dressing of 1½cwts. to 2 cwts. of sulphate of ammonia. A second ploughing should be done in the middle of October, at a depth of 3in. to 4in., later followed by a harrowing. Cultivating should be done as many times as possible, insuring better-quality fruit, and also the improvement in wood maturity.

Tractor v. Horses.

The October meeting of the Morchard Branch concluded with a debate between two members, Messrs. R. McCallum and C. Irvine on the subject, "Tractors *v.* Horses." Mr. C. Irvine said that tractors would, over a period, prove more profitable than horses, the purchase of the tractor being the more expensive. With a tractor a larger area could be worked and worked more quickly, particularly during seeding time when it was necessary to get the seed in at the most suitable time. With a tractor more sheep could be kept, as the feed would not be required for horses and, again, the sheep did good work in keeping the weeds down, particularly on fallow. When not in use the tractor cost nothing. When the day's work was over with a tractor it was over, but with horses it took some time to unharness and feed and water them, thus using a tractor was more pleasurable. Little hay was needed on a farm where a tractor was used and, therefore, with little hay to cut more crop could be reaped.

Mr. R. McCallum favoured horses. He said that a good team of horses was more economical to buy, and with several brood mares good stock could be produced, thus keeping up a young team of horses; also horse breeding was a profitable sideline. A tractor depreciated rapidly in value, while repairs were expensive, particularly when replacing with new parts. Tractors and fuel for tractors were purchased outside our country, thus the money was going out. With buying and selling of horses the money circulated within the country. In the advent of war fuel may become scarce, and prices would no doubt soar. In most instances fodder for horses could be produced on the farms. Horses could always be relied upon, but with a breakdown of the tractor it may be several days before it could be repaired, particularly if the mechanic was some distance away.

Preparing Seed Wheat.

[M. THOMAS, Monarto South.]

The first point in preparing seed wheat is to see that the harvester or header is thoroughly cleaned and that the wheat is quite ripe. It is advisable to clean the machine again at the first emptying. If this is carried out seed wheat should be good for many years. Seed should be graded each year. Grading not only frees the wheat from barley, but at the same time it removes chaff, jackets, cracked and small grain, and should result in the seed germinating very much more evenly when sown. It is advisable to pickle wheat in order to check smut. Copper carbonate is a good dry pickle to check this disease, or bluestone is suitable for wet pickling. If a farmer has not a grader of his own, the best way to have seed graded is to enter into a contract with one of the grader firms who travel through the various districts grading wheat. Such firms will grade and pickle the farmer's wheat on his own property in the one operation, and at a charge of about 10d. per bag. Wheat which contains flying or loose smut should not be selected for seed purposes if possible, because this disease cannot be removed by pickling.

Discussion.—Wheat pickling was discussed from every angle. Some members claimed that dry pickling was not only a preventive, but a cure. One member always used dry pickle for wheat, but found it useless for barley. An instance was quoted of a farmer who pickled only once in 2 years with apparently satisfactory results. Members considered that the risk was too great.

Freezer Lambs.

[R. B. STIRLING, Yadnarie.]

The introduction of freezer lambs has made sheep a better proposition than previously. The value of ewes has been practically doubled. The lambs ensure a quicker turnover than grown sheep; in a normal year they are ready for market in from 3 to 4 months. At the lambing season feed is fairly plentiful, and thus it does not effect to any great extent the sheep-carrying capacity of the farm. For the freezer lamb producer it is far more profitable to keep ewes than wethers. Although wethers return better wool value than ewes, the difference little compensates for the value of the lamb. There is a ready market at a reasonable distance, and at present prices are high. Lamb buyers are plentiful, and thus competition is keen, which causes prices to be maintained. The transport facilities are good, and little expense is curtailed.

When commencing to breed freezer lambs the ewes of the flock should be culled, and only the best kept for breeding Merino lambs. In this way the standard of the Merino lambs is improved. The Merino lambs can be culled and the culls sent to the freezers. If any of the culls are rejected by the buyers, the producer should kill them for his own use; or if they are too poor for this they should be destroyed. By these 2 cullings the quality of the wool improves, thus giving a higher wool return.

The culled ewes are best mated with a British breed of ram, preferably one which produces lambs which will best withstand dry conditions. These rams give better lambing percentages than the Merinos. Cross-bred lambs are far better for freezing than most Merinos because of quicker growing. Therefore they take less feed and are ready for market earlier, thus recording better prices through greater demand. These lambs generally thrive better and do not suffer so much from blowfly attacks.

One of the essentials with lamb raising is not to over stock. Over stocking is likely to cause poor lambs, and for these there is no market. For the producer to safeguard against this trouble it is advisable to conserve fodder. This is best done in the form of ensilage. Not only will ensilage keep indefinitely, but it is the nearest substitute for greenfeed, for production of milk, and the milk production of ewes is the biggest part in the early life of the lamb.

Discussion.—Mr. E. A. Spriggs assured the members that the cross-bred lamb was the best for the early market, due to their rapid maturity.

Mr. Tom Todd stated that a Merino ewe mated with a Border Leicester ram was a cross which he considered best for freezer lamb production. Further, he said that one cannot grow wool and mutton of good quality on the same sheep; hence he advocated the production of either one to the best standard, or otherwise the keeping of 2 separate flocks of sheep, one of Merino and the other for mutton.

Mr. W. L. Brown thought that to grow good wool was equally profitable, and more so when lambs had to be hand-fed.

Mr. A. Todd said that a Merino ewe mated with a Border Leicester ram in November, to lamb in April the following year, was an excellent cross for the production of early freezer lambs.

Can a Profit over Expenditure be Obtained with Wool at 1s. per lb.?

[C. E. Heinrich, Kilkerran.]

To answer this question it is necessary to draw up a list of expenses and view them from different angles.

Wool.—The best type of sheep would be a 4-tooth to full-mouth wether, big frame, and clean face with few wrinkles. To graze on our land as we find it nowadays, in a normal season, I doubt whether our stubble land in Kilkerran left out would grow sufficient fodder to feed one sheep per acre. However, by the use of land that is to be fallowed I take it we could graze one sheep per acre, showing:—

Expenditure.

	£	s.	d.
Interest on 100 sheep at 15s. at 6 per cent.	4	10	0
Shearing	2	10	0
Cost of packs, cataloguing, 1/20 commission	3	5	0
Freight, 5 bales	2	0	0
Labour	5	0	0
	£17	5	0

Income.

	£	s.	d.
100 sheep, 12lbs. fleece, 1s.	60	0	0
200lbs. blls. and locks, 7d.	5	16	8
	£65	16	8
Deduct expenditure	17	5	0
Balance	£48	11	8

This shows £48 11s. 8d. over actual expenses. To the expenditure side we must now add rent for use of land, which, at a reasonable figure, would be 7s. 6d. per acre, amounting to £37 10s., leaving only a balance of £11 7s. 8d., part of which must be used to account for losses by death.

From this we can expect a small profit over expenses by adding rent, which must be charged; but considering the income received in Kilkerran from cereals during the last few years, it is doubtful whether the cropped areas have returned 7s. 6d. an acre rent. Therefore, from this point the sheep, with wool at 1s. per lb., are still worth a place on the farm.

Farmers are too apt to change the mode of working their holdings. Twenty years ago the area cropped was 30 per cent. to 40 per cent. of the holding. During the boom period the percentage of cropped area must have reached nearly 60 per cent. in many parts, barley growing playing a big part in the increase This increase in cropping was responsible for pushing sheep into the background, in many cases no sheep being kept at all. Our land responded well to the continual cropping for two reasons; firstly, it had been worked on a three-year rotation ever since it had come into full production, and through grazing and fallowing had built up a reserve of essential chemicals greater than was required by single crops of wheat; our barley growing not requiring as strong a chemical fodder as wheat, our continual cropping had not shown the effect for ten years. Secondly, we enjoyed a run of years that were up to average rainfalls. We had developed a different outlook on sidelines during flush seasons and good prices, but we have to stick to our sidelines. Even if cereal prices rise, we cannot reap the yield per acre without taking care of our land, and helping the soil to build up its chemical deficiency. One of the important chemicals, nitrogen, can be added by the use of fertilisers, but these are expensive and not as effective as grazing. It seems absolutely essential that a farm carry sheep.

Although wool at 1s. would return a profit, a much bigger income can be obtained by combining lamb raising with wool. To do this one must topdress, which entails more expense, but will show a bigger income in comparison. Another aspect is that continual cropping has robbed our land of the best feed, which makes it necessary to try and replace it with a good prolific grass. Our land being dry, does not give us much of a choice of variety, but Wimmera rye grass grows well. It should be sown with a crop, as it seeds for the next year. A liberal application of phosphate on our stubbles intended for grazing would give sown grasses a chance and encourage our best feeder and soil improver, Medic, even if it is a late feed on the average. Another expense necessary for successful lamb raising would be conservation of fodder for a lean year or late season.

RETURNS FROM WOOL AND FAT LAMBS.

Expenditure.

	£	s.	d.
Interest on 120 ewes at 15s., 6 per cent.	5	8	0
Shearing	2	10	0
Cost packs, commissions, &c.	3	0	0
Freight	2	0	0
Labour	5	0	0
Top-dressing, 90lbs.	14	0	0
Seed—Oats or cape barley	7	10	0
Labour on top-dressing	3	15	0
	£43	3	0

Income.

	£	s.	d.
120 ewes, 9lbs. fleece, 1s.	54	0	0
200lbs. blls. and locks, 7d.	5	16	8
100 lambs, 17s. 6d.	87	10	0
	£147	6	8
Less expenses	43	3	0
Balance	£104	3	8

Again deduct 7s. 6d. an acre rent from balance would leave us a net return of £66 13s. 8d., greater by £55 10s. than the wool proposition on its own without top-dressing. From these facts I should say that although wool at 1s. a lb. does not show a large profit, it does become an important item when lamb-raising is added to it. Together with the benefit the soils derive from grazing, it makes the keeping of sheep a necessity.

Field Day at Penola.

The December meeting took the form of a tour of the district, commencing at Mr. R. R. Rymill's homestead at 10.30 a.m., inspecting Mr. Rymill's office, the various implements, woolshed, and a good oaten crop of hay, then on to where experiments are being carried out with the Council for Scientific and Industrial Research. Experiments were shown, and a brief address given by one of the Council's representatives. An adjournment was then made for luncheon, which was provided by Mr. Rymill. After luncheon, the party visited the properties of Messrs. Fred and Eric Kidman and inspected rye grass pastures. Mr. W. A. Clifford's woolclip was inspected, and a good crop of oats, wheat, and barley, also a rye grass pasture. On Mr. A. J. Ricketts's farm a good paddock of rye grass and strawberry clover was inspected. The next property was Mr. J. W. O'Connor's, where a wonderful paddock of strawberry clover was seen. On Mr. E. R. D. Hinze's property an experimental plot is being carried out with the South Australian Dairy Council. In the plot is perennial rye grass, subterranean clover, and Phalaris. Adjoining this plot was a good paddock of Wimmera rye grass and various clovers. The last property to be inspected was Mr. A. D. Adamson's (where Mr. and Mrs. Adamson provided afternoon tea). Many rye grass and subterranean clover plots were inspected and a good crop of oats and Ford wheat was seen.

Kybybolite Experimental Station Visiting Day.—Mr. R. C. Scott (Chief Agricultural Adviser) addressed a large number of interested farmers on "Fat Lamb Production."

Activities of Women's Branches

AUBURN.

The meeting of 27th November was held at the residence of the Secretary, Miss L. J. Dennison. Mrs. Kench gave a talk on novelty gifts for Christmas. Mrs. Wishart and Miss Wishart exhibited samples of gifts suitable for the season.

BALHANNAH.

Mrs. Norsworthy presided over the meeting held on 21st October, which was attended by 22 members. After dealing with formal business, the meeting took the form of a social afternoon. (Secretary, Mrs. P. Grow.)

BALUMBAH.

Mrs. L. Stutely placed her homestead at the disposal of the Branch for the November meeting. An interesting discussion arose from the reading of the papers presented at the Adelaide Congress. The Branch will go into recess until February. (Secretary, Miss H. Jericho.)

CLARE.

Puddings.

At the September meeting the following paper was read by Mrs. E. Hunter:—Puddings as a food, supply sugar and starch to the body, and are a very important item of diet. The puddings most used can be classified namely; Boiled, Steamed, and Baked.

Boiled puddings are wholesome, nourishing and most suitable for winter. Suet is the fat usually used, but butter or clarified fat may be used with good results. Beef suet is the richer and most generally used, but mutton is lighter and more easily digested; when used for puddings it must be finely shredded. Breadcrumbs added to the mixture are an improvement and make the pudding lighter. Boiled puddings should be mixed stiffly so that the flour absorbs the melted fat whilst cooking, and prevents the pudding becoming sodden. The filling for the pudding may be meat, fruit, or jam. When the mixture is complete, have ready a sound cloth, dip it in boiling water and sprinkle with flour. Tie string tightly, room being allowed for swelling. Tie in a bow so that it can easily be undone. Keep the pudding well covered with boiling water the whole time it is cooking, it is advisable to keep the kettle of water boiling to replenish water in saucepan from time to time. Before serving, lift pudding out and drain for few minutes, the pudding should then turn out without sticking.

STEAMED PUDDINGS.

These are the lightest. They are cooked in a greased basin or mould with a piece of grease proof paper placed on top. The basin should be only 3 parts filled with the mixture to allow pudding to rise. There are 2 ways of steaming puddings—(1) Place mould in covered steamer fitted over a saucepan of boiling water or—(2) Place mould in saucepan of boiling water, the water reaching only half way up the basin. It is advisable to use butter or clarified fat for these puddings as suet takes too long to cook. Care must be taken to keep water boiling rapidly, to provide sufficient steam. A white sauce or a sauce suitably flavoured according to the kind of pudding is served with either boiled or steam puddings. The pudding cloth is easily washed if placed in cold water as soon as it is taken off, it is better not to use soap in washing a pudding cloth.

MILK PUDDINGS.

Milk puddings are usually popular, nourishing and easily digested. Milk is the most valuable and universal food used, it contains representatives of all the food classes, and is a good food for old and young. Baked milk puddings are a good stand by in summer and are made chiefly from cereal, milk, eggs and sugar. They are simply made, but care must be taken to cook the cereal well and to let this cool before eggs are added. When ready to be cooked, place the pie-dish containing the custard in a baking dish with water in it. This will prevent custard from boiling. Puddings are important; cereal and milk contain protien which builds flesh and muscle. In fruit, cereal, and milk there are mineral salts which build bone and tissue. Foods that supply fuel for production of heat and energy and contain starch and sugar are found in milk, cereal, fruit, treacle, and jam. Butter, whole cereals, fruit and milk contain the vitamins which are essential to health. Study the food values of food so that our bodies are properly nourished and get the full benefit of its goodness. Pudding recipes were supplied by other members. (Secretary, Mrs. A. Pollock.)

COONALPYN.

The October meeting was held on the 28th of the month and took the form of a recipe evening.

All members contributed to the programme at the meeting held on 25th November, which was devoted to the reading of recipes for Christmas cooking. (Secretary, Miss E. George.)

COONAWARRA.

Miss A. Marks of the Penola Branch read a paper "Fancy Work" at the meeting held on 3rd November, which was attended by 26 members and 3 visitors.

There was an excellent attendance at the meeting held on 24th November; 46 members and 7 visitors, when a Cookery Competition was held. Miss Campbell of the Education Department judged the entries and made the following awards:—Uniced Biscuits, Miss G. Darwent; Sponge Sandwich, Miss D. Stafford; Sponge Sandwich (for members 21 years of age and under),

Miss G. Allder; Sultana Cake, Mrs. P. C. Stafford; Scones, Mrs. R. J. Childs; Lamingtons, Miss O. A. Lear; Ribbon Cake, Mrs. W. Davis; Pastry, Mrs. R. J. Childs; Light Pound Cake, Mrs. H. Redman; Dark Pound Cake, Mrs. H. Redman.

Summer Drinks and Cordials.

Miss D. Stafford read the following paper at the December meeting, which was attended by 39 members:—

"Rain water becomes hot and unsuitable for drinking purposes, but one can resort to well water from the down pipe, and obtain an excellent cool drink, with a dash of the many varieties of cordials, which also counteract the flavour of well water. There are several different drinks that can be made from lemons, the juice of which is a splendid tonic for the blood; for example, lemon syrup, lime juice, lemon squash, and lemonade. These cordials are purer made from the actual fruit than from the essence which is often used when lemons are scarce, but both make a very nice drink.

Water is the natural drink for man, and however it may be flavoured or disguised, it is the chief ingredient in all his beverages. Not less than 3½ pints of water a day are needed by the ordinary person. In hot weather cold drinks are very refreshing, but if taken too often sometimes chill the digestive organs and depress the nerve centres. For hard working men during hot weather, nothing quenches the thirst better or is more healthful and refreshing than oatmeal drinks, Here are three recipes:—(1) Dissolve ¼ cup of oatmeal in a jug of water; let settle, and drink cold. (2) Take ½lb. sugar, ½ lemon, sliced small, and ½lb. fine oatmeal; mix with a little warm water first, and then pour on 4 quarts of boiling water; stir well together, let settle, and use cold. (3) Mix together gradually in 4 quarts of boiling water ½lb. each sugar and fine oatmeal and 4ozs. cocoa; use when cold.

Lemon Syrup (plain lemon, sugar and water)—6 lemons, 1½lbs. sugar, 4 cups water. Peel the rind off 3 lemons very thinly, juice of 6 lemons, put on the sugar, and pour 4 cups of boiling water over; stir until dissolved, strain and bottle.

Raspberry Vinegar.—4lbs. raspberries, 4lbs. sugar, 3 pints best imported vinegar. Put the raspberries, slightly crushed, into a glass jar with the vinegar. Cover, and keep in a cool place for a week; strain in a jelly bag (do not press it); will take a day to drip. Put in a preserving pan, add sugar, bring to boil, let cool a little, and pour into sterilised bottles; cork and seal.

Lemon Squash.—5lbs. sugar, grated rind and juice of 6 lemons, 1oz. tartaric acid, 1oz. Epsom salts, 2ozs. citric acid, 3 pints boiling water. Put dry ingredients and lemon juice together in basin, add boiling water, mix and dissolve; strain and bottle.

Lemon Syrup.—Grate off the yellow rind of 6 lemons, and beat it up with 3 tablespoons of granulated sugar, press juice out of lemons, and to each pint of juice add 1 pint of water and 3½lbs. of granulated sugar, including that rubbed up with the rind. Set in a porcelain-lined pan, set it on the back of the range, and stir the liquid continually until the sugar is dissolved; then strain the syrup, and bottle.

Lemon and Mint Drink.—2 tablespoons pearl barley, 2 or 3 slices of lemon, 1 sprig of mint, 1 pint boiling water, 1 tablespoon sugar; pour boiling water over barley, sugar, lemon and mint, allow to stand until cold, stirring occasionally; when cold strain off the liquid, and set on ice until ready to use. Just before using, add the juice of 2 small lemons, a little more sugar, and serve with a sprig of mint in each glass or jug."

Mrs. Magarey gave an instructive demonstration of setting a dinner table.

On 18th November 41 members accepted Mrs. H. Reschke's invitation to hold the meeting at her residence, which took the form of a social afternoon. The Secretary (Miss O. Lear) reports that the active membership of the Branch now stands at 51.

ECHUNGA.

The District Trained Nurse addresed the meeting held on 2nd December, and the report of the delegates to the Annual Congres was read and discussed. (Secretary, Mrs. F. Dennis.)

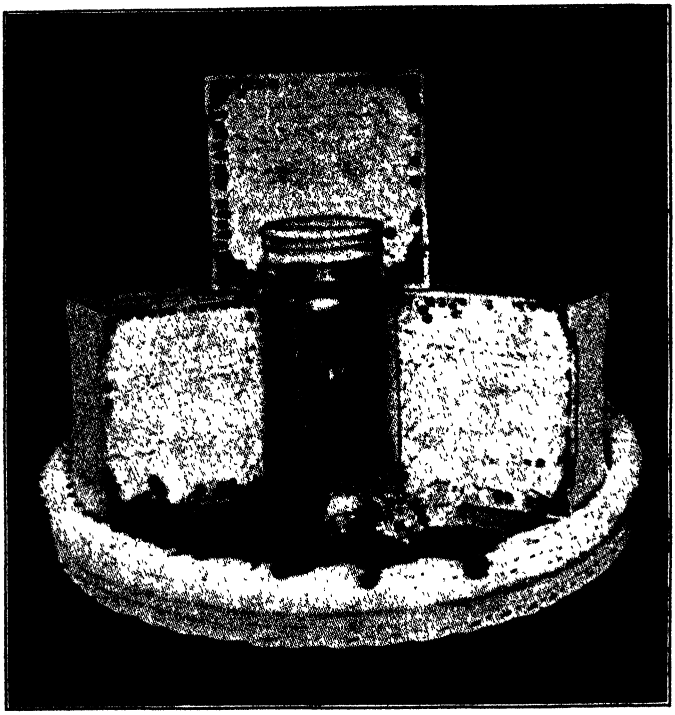
GEORGETOWN.

Members of the Narridy Branch provided the programme for the meeting held on 10th November. On 8th December the meeting was of a formal character, the major portion of the business being devoted to a discussion on the programme to be arranged for the Show to be held under the auspices of the Branch next year. (Secretary, Miss J. Crawford.)

GLADSTONE.

Forty members attended the November meeting. Mrs. Spottswood read a paper, "Child Welfare." The "Summer Pudding" competition was responsible for 16 entries, the following recipes being those of the first and second prizewinners:—

Queen Pudding.—1 breakfast cup breadcrumbs, 2 dstspns. sugar, 1oz. butter, 1 pint milk, 2 eggs, flavouring, 2 tblspns. raspberry jam. Put the bread crumbs, butter and half the sugar in a basin, and pour over the hot milk. Let stand 15 minutes. Add the beaten yolks of eggs. Pour into a greased pie dish and put in a slow oven until set. Spread the top with jam. Beat whites of eggs stiffly with the rest of the sugar, pile on top of pudding, place in oven until a golden brown. Serve with cream when cold.



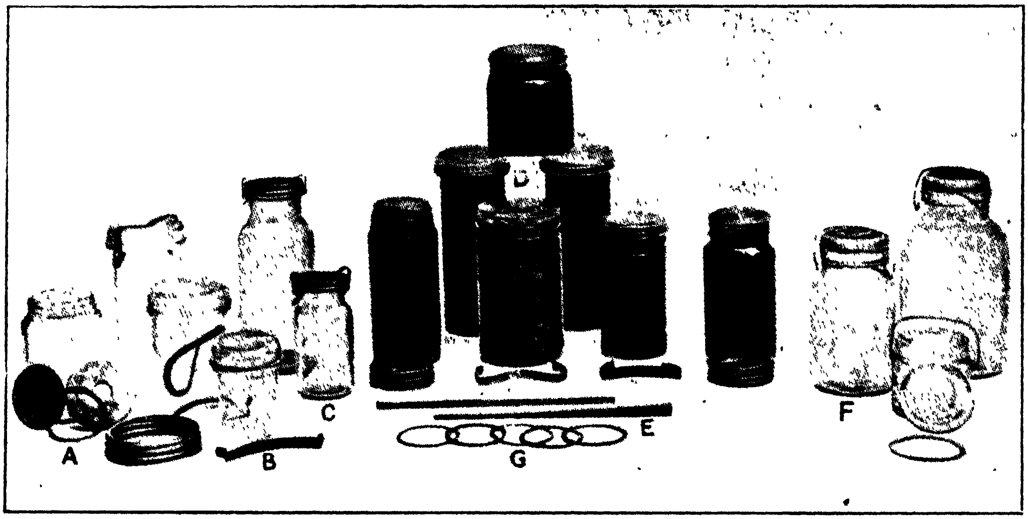
Jelly Plum Pudding.—3 dstspns. granulated gelatine, ½ tspn. vanilla, ¼lb. lemon peel and nuts, 1½ squares chocolate or 3 dstspns. cocoa or 1 tbspn. coffee essence, 1 cup raisins, ½ cup each sultanas, currants, and sugar, 1½ pints milk, pinch of salt. Place milk, with chocolate, cocoa, or coffee essence, in saucepan and bring to boil. Put lemon peel, nuts and fruit through mincer, add to the boiling milk, and cook for 5 minutes. Let it cool. Dissolve gelatine in a little hot water, and add to the milk, stirring all well together. Pour into a wetted mould. When set, turn out and decorate with holly. Serve with cream or cold custard. (Secretary, Mrs. L. J. Sargent.)

KANGARILLA

Honey.

At the October meeting of the Kangarilla Branch, a paper on Honey was read by the Secretary, Mrs. Steer:—

Honey is a very valuable food, especially in winter time. It is equally as good for adults as children, and being much cheaper than sugar, can be used extensively in the home. Children enjoy bread and candied honey, and in liquid form on the breakfast cereal. Honey is assimilated by the system at once, whereas sugar has first to be digested. Honey is more wholesome than sugar and helps to promote good teeth. Mint sauce has a much richer flavour and will keep fresh longer if sweetened with honey. In lemon drinks, honey is better than sugar, and it can also be used in milk puddings and for sweet making. In using candied honey for jam, 1 tbspn. equals ½lb. sugar. Equal parts of honey and lemon juice make a good remedy for sore throats. Honey can be used instead of so much sugar in biscuits and cakes. Honey varies in taste and colour, according to the blooms it is taken from. Light honey is more readily bought than dark honey, although some people prefer dark honey on account of the flavour.



A—Screw top bottle with lacquered metal top and rubber ring.
B—Three jars with glass covers and spring clips.
C—Two bottles with aluminium or lacquered metal lids and spring clips.
D—Full bottles and jars with clips and screws removed
E—Packing sticks for use in arranging fruit in jars.
F—Wire clip bottles with glass covers.
G—Rubber rings

KOOLUNGA.

Preserving Fruit, Meat, and Vegetables.

The Koolunga Branch held its October meeting on the 15th of the month, there being 38 members present. Miss Cooper read the following paper on "Fruit Preserving":—

All bottles must be thoroughly sterilised by placing in a warm oven for a few minutes before using. For peaches, pears, cherries and apricots, I use a syrup consisting of 1lb. sugar to 1qt. water, never less if fruit is very firm. Boiling water is poured over the sugar which dissolves it quickly. Strain the syrup through clean muslin before pouring it over the fruit. The fruit must be quite firm and free from spots, but not too firm to be still unripe. After carefully wiping fruit with a damp cloth, pack it in bottles. Apricots should be cut in halves. These are placed downwards, one piece should lap over the other, each layer crossing the joints of the layer underneath. Pour in the syrup to within ½in. to 1in. of the top of the bottle.

After placing fruit and syrup in bottle, the rubber ring is then fitted evenly in the groove of bottle. Place on cover and finally the clips. Place bottles of fruit in steriliser. As my steriliser holds a case of fruit, it takes an hour to reach the correct temperature. Carefully follow instructions and the fruit will be bottled successfully. for dark plums, only add 1 tspn. of sugar to each bottle. For tomatoes use ½ tspn. of salt with water. Tomatoes are peeled by firstly pouring on boiling water.

BOTTLING MEAT AND VEGETABLES.

Thoroughly prepare the meat, either by boiling, roasting, stewing, making into mince with vegetables, as for meat pies, frying with onions and brown gravy, or corn either beef or mutton, then cook in the usual way and sterilise. Cut all meat into useful sizes or according to the size of the bottle; Nos. 31 and 36 are the most suitable bottles to use for meat. Pack the meat fairly tightly into bottles, allowing only enough room for the liquid to run in between. Fill the bottles with gravy, stock or fat, to which if using gravy or stock, add a little gelatine, first dissolving the latter in water. About ¼oz. gelatine to 1 pint of liquid is sufficient. Put on the ring, cover and clips and sterilise at boiling point for ½ hour. *Do not let it boil as the bottles are apt to move and come in contact with each other and so become cracked.* After removing from the steriliser do not take off the clips, because the meat must be re-sterilised after being allowed to stand for 48 hours, when it should be re-heated for ½ hour at 200 degrees. Do not on any account remove the clips until the meat is thoroughly cold, and always use two clips on all meats crossing them in the centre of the bottles. New rubbers must be used for all meat, fish and soup, and new rubbers tend to lift the lids.

After 12 years I have only lost 1 bottle of fruit, 2 of meat and 3 of soup. The failure with the meat and soup I attribute to the use of parsnips. These have a tendency to send off a very strong gas which causes ferment.

Celery, when bottled crisp and fresh and cut into short lengths, can be cooked either in white sauce or heated, then strained and put back in a saucepan with a piece of butter, and pepper and salt to taste. Served on toast it equals asparagus as an entree to any dinner.

Tomatoes bottled either whole or sliced and packed well in the bottles do not need any liquid. They can be served on crisp lettuce leaves, used for sandwiches, or as a vegetable, or on toast for breakfast. To prepare for bottling, pick clean, round, and sound tomatoes, drop into boiling water for a minute or two, then skin. Add salt to taste. A pinch of sugar when re-cooking or sprinkled on them when used for sandwiches imparts a delicious flavour.

BEANS.

Broad beans are one of the nicest of vegetables when bottled, but they have a milky appearance in the bottles. Cook them in plenty of salt water from 10 to 20 minutes, then strain, pack in the bottles, fill the jars with almost boiling water, add a little salt and seal down. French beans—I prefer them sliced; always use young and tender beans as they have a tendency to go stringy when old.

Cauliflower is a vegetable most people like and should never be overlooked when you have a plentiful supply in the garden. All vegetables must be re-sterilised after being allowed to stand for 48 hours. Re-sterilise for ½ hour at 200 degrees.

SOUP.

Soup is a useful stand-by at any time, and a fair supply should always be on hand for emergency, or in cases of sickness.

KOONUNGA.

Thirty-two members attended the meeting held on 19th November, when the following papers were read:—"The treatment of Wounds and Injuries," Mrs. R. Bentley, and "The Guides and Brownies Display in Adelaide" by Misses Pedler and Pengilly. (Secretary, Mrs. C. Buchanan.)

KYBYBOLITE.

The Chrysanthemum.

The following paper was read by Mrs. J. Heffernan at the August meeting.—

Australian raised chrysanthemums are regarded as equal to any in the world. Probably there is no flower grown that responds more to special treatment than the chrysanthemum. Grown purely for decorative and cutting purposes under normal conditions, in average fertile soil, a small cutting 2 to 3 inches in length, will grow in a few months to a large bushy plant. This, in the Autumn, will be a mass of blooms which when cut, will keep for a long time in water, or left on the bush will last for many weeks. Give the same cutting richer soil, reduce the number of main stems and disbud all lateral growths, leaving only one flower to mature, and blooms of giant proportions are obtained. In the case of Japanese flowers, they have been known to be 12 inches in diameter. The size, form, shape and even colour are altered, the flower being hardly recognised as the same grown under normal conditions. This should be remembered by amateurs who visit shows and pick out the names from the exhibits, and then vilify the nurseryman because his plants only produce small blooms. When plants are put out in the general garden under normal conditions, if large blooms are wanted, richer soil must be provided, incessant patient labour given, and only a few blooms allowed to a plant. Single chrysanthemums stand on their own for decorative purposes. With little effort, large sprays of single and semi-double blooms, with two to six rows of petals, and an open centre, are produced, all borne on stiff stems, admirably suited for floral decorations. Such varieties as Gwen Holten, Thelma Ford, Gorgeous, are well known, but the variety is endless, new colours being raised every year. The latest champion at the National Chrysanthemum Show this year, "Shirley Temple," should be in every collection.

Pompones produce innumerable small button-like double flowers, from the size of a sixpenny piece upwards; the smaller the flowers, the more valuable. Of all classes these are perhaps the easiest to grow, and more serviceable for decorative purposes.

Chrysanthemums may be raised from seed, and new varieties are continually produced by this method, but if certain varieties are wanted use cutings or rooted suckers from an old plant.

Plants when finished flowering are cut back and a big crop of suckers form from the old stem. The smallest of these put out will make a large plant by the next flowering time and will produce many more blooms, all of superior quality than if the old plant is allowed to grow undisturbed in the same position.

In lifting old plants and dividing, do not plant back a portion of the plant with several runners, but select a strong rooted piece with a single stem and plant this back. As it grows upwards, nip out the crown and from the laterals formed, shape the bush so as to have a bushy plant grown on a single stem. Far better flowers are obtained in this manner than if several stems from the ground grow together for each stem has independent roots and is in fact a separate plant, and growing in a congested state, one plant starves the other.

Exhibitors prefer to root cuttings fresh from the top of a strong runner, claiming that less suckers form during the growing period, robbing the plant of sap. Cuttings root readily in the open ground or in boxes of sharp sand. Planting chrysanthemums in the ground is best deferred until September, put out too early, the tendency is to grow too large from the start with much sappy growth necessitating cutting back two or three times. Seed sown in August will flower the first year.

Twenty-two members attended the meeting held on 29th September. Mrs. H. Naylor reported on the Adelaide Congress. Mrs. L. J. Cook tendered her resignation as a member of the Branch and it was decided to place on record an appreciation of the valuable work she had performed in the interests of the Bureau.

Mrs. Gwynne of Naracoorte gave a demonstration of basket making. The speaker exhibited a collection of beautiful and useful baskets made from coloured twine and wood fibre.

An address, "The Food Value of Milk," was given by Miss E. Campbell, of the Education Department, at the meeting held on 23rd November, which was attended by 23 members and several visitors. (Secretary, Mrs. W. Kekwick.)

LAURA BAY.

The meeting on 10th November was held at Mrs. W. Bowell's homestead, and she gave an address on scone making. Christmas novelties were displayed for inspection.

Summer Salads.

A paper on "Summer Salads" was given by Miss R. Blumson (Secretary) at the meeting held on 8th December, as follows:—

"In hot weather most people prefer cold meals, and there are so many recipes now that making salads is quite simple. Cold meals are also an advantage to the cook; she can prepare all that requires cooking in the early morning, and thus save standing over a hot fire in the heat of the day. Cold meals with plenty of salad from raw vegetables are of greater food value than cooked ones, since the latter lose much of their valuable constituents in cooking. Practically all cooked vegetables can be made into salad, and provide a welcome change from boiled dinners. A nice dressing is a finishing point to any salad, cooked or otherwise.

Recipes for these summer dishes are so numerous that they can be varied every day. Salads can be made to look so tempting and dainty if garnished with thin slices of gherkin, grated carrot, hard-boiled eggs, parsley, &c. Since any vegetable can be used in a salad, there are always lima and haricot beans to fall back on when fresh vegetables are not procurable. Peas make a delicious salad if cooked and pressed into a basin, and, when cold, cut in slices and served with a dressing. Raw cabbage is also nice, and can be served alone or with additional vegetables. Grated carrots are of a high food value, and should be eaten raw as much as possible.

The potato is a good standby, and makes a nice salad, either cut in slices or mashed with butter. Sliced onions, gherkin, celery, tomatoes and cucumbers are an additional improvement to a potato salad. Cauliflowers, trombone, turnips, swedes, spinach, and other cooked vegetables can be used to good advantage.

For raw vegetables there are beetroot, radish, lettuce, celery, onions, tomatoes, cucumbers, &c. Dressing should not be poured over salads until they are sent to the table. Have the dressing on the table in separate jugs, so that it can be used as required.

Recipes.

Bean and Tomato Salad.—Have a dish of cooked green French beans, same quantity of tomatoes (sliced). Serve with a dressing made with the yolk of an egg (hard boiled), and mix with 1 tsp. sugar, ½ tsp. each salt and mustard, a little pepper, mix with ½ cup cream, 1 tbsp. lemon juice (or vinegar, if preferred).

Potato Salad.—6 potatoes, 3 hard-boiled eggs, 1 onion; slice, and put in alternate layers; add pepper and salt, and serve with a boiled dressing; decorate the top with grated carrot or parsley.

Potato Salad (2).—Mash potatoes with butter, milk, salt and pepper. Slice an onion finely; put potatoes neatly in a dish, sprinkle onion over, and place a layer of lettuce around the edge; garnish with hard-boiled eggs and parsley; serve with dressing.

Lettuce Salad.—Slice 2 lettuces finely, add a few shallots, or a little onion cut finely, a little sugar, and some hard-boiled eggs. Mix all well, garnish as desired, and serve with a boiled dressing.

Variety Salad.—2 lettuces, 1 onion, 2 tomatoes, small cucumber, stick of celery. Slice all finely, and place lettuce, onion and celery in glass dish. Place alternate layers of cucumber and tomatoes around the edge, placing each slice half over the other, and put a few pieces in the centre. Serve with dressing.

Beetroot Mound.—3 cooked beetroots, 1 small lettuce, 2 tomatoes, 1 dspn. gelatine, 1 cup hot water, salt, pepper, sugar, and vinegar to taste. Dissolve gelatine in hot water, and add salt, pepper, sugar and vinegar when cold. Pour over sliced beetroot, and allow to set. Garnish with shredded lettuce and tomatoes, and serve with a dressing.

Tomato Salad.—6 ripe tomatoes, 1 onion, 1 cucumber, 1 stick celery. Slice all finely, sprinkle with salt, pepper and sugar, and add vinegar.

Centenary Salad.—Take equal parts potatoes, cauliflower, and trombone, chop and mix all together, and garnish with slices of gherkin and grated carrot. Serve with a boiled dressing.

Silver Beet Salad.—2 cups cooked silver beet, a few shallots, 1 cup cooked white turnips. Mix all together, adding salt and pepper. Arrange radish and beetroot slices over the top. Serve with dressing.

Bean Salad.—2 cups cooked Lima beans, 1 cup cooked sliced carrots, salt and pepper. Sprinkle with chopped parsley, and serve with a dressing.

Salad Dressing.—Mix 2 eggs, 2 tsps. mustard, 1 tsp. salt, ½ tsp. pepper, 6 tsps. sugar, 4 tsps. flour, 2 cups milk, 1 cup vinegar; put over fire, and stir until it thickens (must not boil). Cook for 7 minutes.

Mrs. R. Burke read a paper, "The Uses of Prunes."

MALTEE.

The delegates to the September Congress presented their reports. Discussion also took place on the Exhibition to be staged next year at Ceduna.

"Suggestions for Christmas Gifts," was the subject set down for the December meeting. This resulted in a number of interesting novelties being exhibited. Mrs. Talbot showed how to decorate a table for a children's party. (Secretary, Miss L. Schwarz.)

MANGALO.

During August, the Branch held its Annual Social, and at the October meeting, delegates to the Annual Congress presented their reports.

The final meeting for the year was held at the residence of Mrs. F. Coles, when Mrs. Cleave gave a demonstration of dressmaking. (Secretary, Mrs. B. M. Coles.)

McLAREN FLAT.

Mrs. K. Warren and the Secretary, Miss F. Bell reported on the proceedings of the Adelaide Congress and made eulogistic references to the addresses, demonstrations and papers contributed at the various sessions.

MILANG.

Recipes for Christmas cooking were exchanged at the meeting held on 11th December, which was attended by 12 members. The following hints on making useful articles for the home, which could also be given as suitable gifts, were sent in by members:—

To Make a String Container.—Take a cocoanut and saw off a piece from the side opposite the "monkey face" large enough to admit a ball of string. Then scoop out the inside. Next make a hole in the piece sawn off and also at the top of the hole. Join the two pieces with a piece of small wire or string to form a hinge—do not attempt to bore the holes, as the cocoanut is apt to split—scrape them with the point of a knife. Make another hole in the top of the nut and insert a wire hook so that the nut hangs upright. To make "features" on the monkey face, carve the shape of the lips slightly and make a hole in the centre of mouth. Slightly carve the eyebrows, then paint brows, eyes, nostrils, and mouth with various shades of duco as liked. Finish by swathing any old piece of material round the "head" to form a turban, and place a ball of string inside the nut, threading the end through the hole in the lips. Another string container was done in treble crochet, drawn up at the top with a crochet chain and fitted with a cheap pair of scissors.

Pottery Painting.—Procure a vase or other suitable article which has been glazed inside, but not outside. These are obtainable at very moderate prices from the potteries. Coat it evenly with thick white paint (water colour) and leave until dry. Having decided on the colour for the background, put it on with a sponge, as this spreads the colour more evenly than a brush. After this is dry, paint on the design, being careful that each coat or colour is dry before the next is added. Finally varnish the whole with clear dulux to give a glossy finish.

A small powder bowl was also exhibited, having a background done similar to the vase, and ornamented with modelling. For the modelling, a jar of Barbola paste is required. Assuming the design to be a spray of flowers, each leaf or petal of the spray must be modelled separately and glued securely in place, until the whole design is complete. Allow it to set hard, then coat the design with white paint, and later paint with water colour in the colours desired, and finish with clear dulux.

Papier Mache.—Either grease the plate, crumb tray or other article to be used as a model or cover it with a sheet of thin paper, and commence work. Tear the paper in small pieces (linen note-paper is the best), and glue over the model, allowing each layer to dry before putting on the next. Avoid cut edges as much as possible, as these make a sharp edge. When the article is sufficiently thick, remove it from the model and tear the thin paper off the back. Do the bottom with Indian ink, and if liked, paint a design on the front. Give both sides a coat of clear varnish to finish.

To Make a Fancy Blotter.—A piece of three-ply, about 5in. x 8in. or any convenient size is needed. Square it up if necessary, and sketch any suitable design on it. Do the colouring with water colour and outline the work with Indian ink, or have it "pokered." Paint with a clear varnish or a solution of shellack and methylated spirits, bind the edge of the wood with passe-partout (a piece of linen window blind is a good substitute) and paste the blotter on the back.

A novel pin-cushion was made of an ice-cream cup, millinery wire and scraps of velvet. The wire was bent in loops to resemble a species of cactus, then padded and covered with soft dull-green velvet. A long end of wire was left at the bottom, and this was placed in the ice-cream cup which had been previously ducoed to represent a flower pot, and then filled with a mixture of glue and sand, stiff enough to keep the "cactus" standing upright. Sprinkle shellgrit on the top to give a natural finish. Pins are stuck in the "Cactus" to represent thorns.

A novel plate was made from an ordinary plate covered with coloured papers—wrappers from sweets are very suitable. Cut the pieces small and fit them in without any set design until the whole plate is covered with glued-on pieces. Outline the edges with Indian ink and cover with clear varnish. (Secretary, Miss R. Whitfield.)

MILLICENT.

At the meeting held on 20th November, which was attended by 11 members, Christmas cooking recipes were given by Mesdames Allen, Willshire, Oberlander, and Hutchesson. A further meeting was held on 18th December, when members discussed arrangements for holding a Cake Competition. (Secretary, Miss Hutchesson).

MONARTO SOUTH.

Household Hints.

Mrs. H. White presided at the meeting of the Monarto South Branch, held on 28th November, which was attended by 13 members. Miss E. Hein read the following paper:—

If artificial flowers want freshening up, iron the petals with a hot teaspoon. They need not be removed from hats, &c., for this treatment. Paint marks on clothing may be removed by rubbing the marks well with plain flour. Allow the flour to remain on all night. Brush well in the morning. When washing linoleum, add a tblspn. of floor polish melted in 1 cup of boiling water to the water that is used. This saves further polishing. When tying down jam pot covers, damp the string. The knot will not slip and the string will shrink and tighten in drying. For scorch marks, wet the part that is scorched with cold water and place it in the sun. When dry the marks will have disappeared. When bottling jam, if a spoon is placed in the jar, the jam can be bottled at boiling point, without cracking the jars.

When court shoes begin to slip, rub the inside of heels gently with very fine sandpaper. This restores the original grip, and obviates the necessity for rubber grips. To remove beetroot stains from a tablecloth, soak a piece of bread in water and place it on the stain. Cheese wrapped in a cloth kept damp with vinegar, and placed in a covered dish will remain moist and keep indefinitely. The quickest remedy for a blistered heel is the white of an egg. Smear it over the heel at night and all soreness will have disappeared by morning. To prevent icing sugar from becoming hard and lumpy, sprinkle rice in the bottom of the tin in which it is kept. If icing sugar is lumpy, sprinkle a little water over it, and put in a medium oven for a few minutes. It will become quite soft. Soursobs rubbed on copper will make it shine like new.

Instead of candles on a birthday cake, take the necessary number of shelled Brazil nuts, sharpen each one to a point and place upright on the cake. These nut candles can then be lit with a match and will burn as a candle. The burnt part can be cut off, and the rest of the nut eaten if desired. To clean a badly burned saucepan, fill it it with damp soil and leave overnight. Tip the soil out in the morning and the burnt particles may be easily removed. After mixing a sponge cake, when put in the tins, stand out in the open air for a few minutes. Then bake in the usual way. To relieve toothache, get some pure vinegar and three or four pieces of cotton wool. Put vinegar in an enamel pan to simmer, and while simmering, dip in a piece of wool and apply to tooth while hot. After one or two applications the pain usually vanishes.

To prevent cutlery from staining when cutting acid fruits, rub on a little butter beforehand. If tomatoes have become soft and only fit for cooking, place them in a basin of cold water, in which some salt has been dissolved. Leave for 2 hours, and on lifting they will have regained their firmness. Chewing dates before and during a train journey, will in most cases prevent train sickness. When washing children's knees and knuckles, put a little carbonate of soda on the washer. It acts like magic on the dirt and grime and does not affect the skin. To remove adhesive tape or plaster painlessly from a tender part of the skin, moisten the plaster with eucalyptus and it will peel off easily. (Secretary, Mrs. F. Liebelt.)

MORCHARD.

Jelly Making.

Mrs. C. Schulz occupied the chair at the November meeting of the Morchard Branch. Mrs. B. McCallum gave an interesting talk on "Inexpensive Christmas Gifts" and Miss G. Halliday read the following paper.—

Quite a number of people prefer to make jellies of berried fruits, for by doing so they avoid the unpleasantness of the pips Making jelly is not nearly such a difficult business as many people imagine, and one does not need any particular outfit. There are certain rules to be observed; the fruit should never be over-ripe, for with jellies it is essential to have the greatest amount of pectin and this is always to be found more in under-ripe fruit, but not bad fruit.

The most suitable fruits for jellies are apples, brambles, all varieties of currants, gooseberries, and quinces. The first step is to obtain the juice. Put the fruit and water into a pan and boil together gently until the fruit is soft and broken. If the fruit is one which is a difficult "setter," this can be remedied by adding a little juice of another fruit instead of water.

When the fruit is soft, mash it well, then strain through a straining bag or coarse cloth which can be hung up on any convenient nail with a large basin underneath and the fruit allowed to drip. When the weather is cool, leave the bag to drip overnight, but if the weather is extremely warm this is rather a risky process, as juice will sometimes ferment in the heat.

Hints on boiling:—Boiling is one of the important factors in jelly-making and upon it depends the clearness and colour. There are two methods of doing this, (1) boil the juice and sugar together, and (2) bring the juice to the boil alone and then add sugar. I favour allowing the sugar to dissolve completely before bringing them both to the boil. Over-boiling is inclined to make jelly cloudy and also to lessen the strength of the pectin, so always test the jelly at intervals and as soon as it jellies remove it from the heat. With these rules in mind, jelly-making should be a complete success.

Recipes.

Apricot Jelly:—Have some ripe apricots, sugar, and lemon. Remove the skins from the apricots by plunging in boiling water. Halve the fruit and blanch the kernels. Weigh the fruit and allow pound for pound of sugar. Add a few kernels and the strained juice of a lemon. Simmer gently until fairly thick and then pot up. Store in a cool dry place.

Damson Jelly:—Damsons and sugar. Choose fruit which is firm, dry, and ripe. Remove the stalks and put it in a large jar. Cover closely and place in a pan of cold water, cooking slowly until the fruit is tender. Strain through a jelly bag, measure 8ozs. to 10ozs. sugar to each pint of juice, boil until the jelly sets, when tested pot and cover in the same way.

Grape Jelly:—3lbs. grapes, 1 pint water, sugar. Wash the grapes, place in preserving pan with water and cook until soft. Strain through a hair sieve or a jelly bag. Measure the juice and boil for 10 minutes. Add 1lb. of sugar to each pint of juice. Dissolve sugar slowly, then boil 15 minutes or until it sets. Place in warm, dry jars and tie down at once. (Note.—As grapes are very tasteless, it is a good plan to add a little juice of a fruit of rich flavour.)

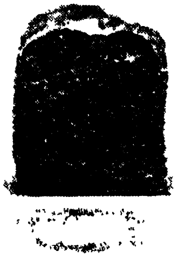
Raspberry and Red Currant Jelly:—Raspberry and red currants, sugar. Wash and pick the fruit and place it while still moist in preserving pan. Heat over a moderate fire to extract the juice. Strain through a jelly bag, measure the juice and then boil for a few minutes. Add 1lb. sugar to every pint of juice and boil gently until it sets.

Quince Jelly:—6lbs. quinces, 4½lbs. sugar, 2 pints water. Put all on together and boil 2 hours. Do not stir but shake gently once or twice. Wipe quinces but do not cut or peel. (Secretary, Miss F. Brown.)

MYPONGA.

Bread Making.

The following paper was contributed by Mesdames Llewellyn and Martin at the meeting held on 23rd October:—"Good bread can only be made from yeast and flour of the best quality. To make the yeast: Take 1 fairly large potato, boil it and mash it, and from the water in which it was boiled, retain 1 cupful, and allow it to cool. Pour 1½ cups on 1 heaped tbspn. of hops and boil for 5 minutes. Put 1 tbspn. each of flour and sugar in a basin and mix. Then strain the boiling hop water on to it, stirring at the same time. Allow it to cool, then mix the potato and hop preparations together and put in the yeast bottle. Tie down the cork and the yeast should be ready for use in 6 hours.



Making the Bread.—1gall. of flour; (about 6lbs.) 2 tbspns. salt, 3 pints warm water (or half separated milk) and 2 cups yeast. Sift flour and salt into dry clean pan. Make a well in the centre of the flour and gradually stir in the liquid yeast. Mix into a dough and knead for 20 minutes. In winter, cover warmly and leave to rise over night. In summer it is better to mix the dough in the morning. In the morning, knead, and take care when doing so to use only sufficient flour to keep the hands from sticking to the dough. Divide into 4 and form into loaves. Put into warm lightly floured and greased tins. Place the tins on the oven door, cover with a cloth and leave to rise for 1 hour. About 15 minutes before the bread is ready for the oven, close the oven door, then bake for one hour. If cooked, the bread should give a hollow sound when tapped on the bottom of the loaf.

YEAST RECIPES.

Acid Yeast.—Boil a medium-sized potato in about 1 cup of water. When cooked mash and add 1 dstpn. sugar, 1 tbspn. flour and as much tartaric acid as will lie on a 6d. piece. When cool, put in a small bottle to within 4 or 5ins. from the top and add hop yeast to within 1 inch of the top. This should be prepared the morning of the night it is proposed to make the bread.

Hop Yeast.—1 loose handful of hops, 1 handful of sugar, 2 pints cold water and boil until it is reduced to about 1 pint. Strain and add 1 dstpn. of salt, 1 tbspn. flour. Set it to work which takes a few days. Then use from that in another bottle. Peel 1 medium sized potato, cover with water and boil until soft. Strain off water and keep it. Mash the potato and add 1 tbspn. each of sugar and flour, enough tartaric acid to cover a 6d. piece, 2 tbspns. of hop yeast and about ½ cup of potato water. Put in a bottle and leave to work for two days. (Secretary, Mrs. M. Bounds.)

NARRIDY.

Mrs. Klingner presided over an attendance of 20 members at the November meeting. Miss L. Roberts read an instructive paper and gave a demonstration of Fruit Bottling. On 10th November, members attended a meeting of the Georgetown Branch and took charge of the programme. (Secretary, Miss B. Reynolds.)

O'LOUGHLIN.

Delegates reported on the Adelaide Congress and consideration was given to the suggestion of holding a Summer School, at the meeting held at Mrs. C. Kloeden's residence on 30th October

Miss J. Hastings presided over an attendand of 9 members at the November meeting which was devoted to drawing up a programme of meetings for the ensuing year. Members of the Men's Branch subsequently joined the Women's Branch at supper. (Secretary, Miss E. Lutz.)

PINBONG.

The meeting took the form of a Question Box and was held on 14th November, at the residence of Mrs. C. Sholz. It was decided that members who had not previously given a paper should take charge of at least one meeting during the coming year. (Secretary, Miss D. Scholz.)

RENDELSHAM.

Reports of the Adelaide Congress were given by the delegates at the meeting held on 4th November, which was attended by 9 members. The Branch will be in recess during January.

With an attendance of 14 members and 28 visitors, a very successful meeting, which took the form of a Christmas party, was held in the Institute on 4th December. (Secretary, Mrs. Z. Bignell.)

SADDLEWORTH.

Members held the November meeting at the residence of Mrs. Vogt. An interesting paper, "A Trip to Western Australia" was read by Mrs. F. Coleman. Sixteen members and four visitors attended. (Secretary, Miss G. Frost.)

SHEOAK LOG.

Thirty-five members were present at the meeting held on 10th December. Sergeant Lenthall, of Gawler, gave an instructive address on "Rules of the Road." The Secretary, Miss K. Koch, reported that parcels of books and magazines had been sent to the Warcowie and Coonalpyn Branches. Two new members were proposed.

SNOWTOWN.

The Snowtown Branch held a novel meeting on 4th November. This took the form of an exhibition of antiques and war relics. Seventeen members and 12 visitors attended. (Secretary, Mrs. M. Jenkins.)

STRATHALBYN.

At the meeting held on 5th November, which was attended by 20 members and 11 visitors, Miss Pearce, of Point Stuart, gave an address and demonstration, "First Aid to the Injured." Mrs. C. M. Hudd (Secretary) reports that membership of the Branch is rapidly increasing and that meetings are well attended.

Twenty-two members were present at the December meeting when the following Question Box was conducted:—

When making a plain cake, which is the better—to add eggs well beaten, or one at a time?—Ans. Depends on the cake. A fruit cake, add eggs well beaten together; but a plain cake, add eggs to mixture 1 at a time, and beat well.

Why does a cornflour sponge go down to ¾ the size, though well cooked, after taking out of the oven?—Ans. Always leave in tins until quite cold.

What makes a sponge tough, even when well beaten?—Ans. Beat as little as possible after the flour is added.

What will remove mildew spots from table linen?—Ans. Squeeze lemon juice on spots, then sprinkle with salt, and put article out in the sun.

A recipe for summer sweets?—Ans. *Pineapple Flummery*—1 tin pineapple, 1 packet jelly, hot water, 1 pint milk, 3 eggs, 1oz. sugar. Arrange the slices of pineapple at the bottom and sides of a dish, pour enough hot water on jelly crystals to dissolve them, and then make up to 1 pint with the pineapple juice. Put the milk on to heat, beat the yolks of the eggs and sugar with a wooden spoon until lemon colour, pour over this the hot milk, stirring all the time. Return to saucepan, and stir over a low flame until the mixture begins to thicken. Put aside to cool, then beat custard into jelly with a fork. Lastly, add the beaten whites of eggs. Pour into dish containing pineapple, and put into a cool place to set.

How do you roll out for a sponge roll?—Ans. When cooked, roll out on damp cloth, and roll up again with the cloth for 2 minutes; then roll out again, and spread with jam, and roll up.

Why does a jam sandwich go sticky?—Ans. Too much sugar is often the cause.

When is the correct time to re-pot ferns?—Ans. In September; and when you cut the old foliage back just singe off the stems remaining, and the ferns will then shoot well.

How to clean a porcelain bath?—Ans. Lemon juice and salt was the only satisfactory method that had been used.

What causes cornflour sponge to settle down with a firm coating on the tin?—Ans. Grease the tins, as well as the paper for lining.

Recipe for ginger beer?—Ans. To 1gall. of water add ½oz. of whole ginger (bruised) 1 tbsp. cream of tartar, 1 tsp. acid, 1lb. sugar, 1 tbsp. yeast. Dissolve sugar and acid in a little hot water, put piece of ginger in each bottle, fill up, and cork tightly. Let stand for some time before using; no boiling required.

TANTANOOLA.

Two meetings were held during October. On the 7th of the month Mesdames Altschwager and Considine gave reports of the Annual Congress and on the 28th Mrs. Stafford read a paper, "Cut Flowers for the Home."

WARCOWIE.

The November meeting was held on the 24th of the month at the residence of Mrs. Hilder who read a paper "Christmas Gifts." (Secretary, Mrs. Avery.)

WASLEYS.

On 5th November, the Vice President Mrs. E. Day presided over an attendance of 11 members, when the Secretary, Miss K. Harding gave a report of the Annual Congress. A combined annual meeting of the Men's and Women's Branches was held on 27th October. It took the form of a social evening and short addresses were given by Dr. Callaghan, Principal of the Roseworthy College, and Mr. F. C. Richards (Assistant Secretary of the Agricultural Bureau).

WILMINGTON.

Mrs. Genders occupied the chair at the meeting held on 8th October, which was attended by 31 members and 19 visitors. Mr. J. O. Hatter (District Dairy Adviser) addressed the meeting on "The Quality of Farm Dairy Produce" and judged the 11 entries in the Butter Competition. Mrs. Genders has been an enthusiastic worker of the Branch, and on her leaving the district members tendered her a farewell afternoon and made her a presentation in recognition of her services. (Secretary, Mrs. P. Cole.)

WIRRABARA.

With an attendance of 47 members and 21 visitors, evidence is not wanting of the interest that has been created in the Agricultural Bureau by the women of Wirrabara. A practical demonstration of cake decorating was given by Miss Zwar. (Secretary, Mrs. E. Harding.)

YANDIAH.

Miss A. Kupke gave an interesting address in which she described a visit she had recently paid to the Lobethal Woollen Mills. (Secretary, Miss O. Keller.)

ADVANTAGES AND PRIVILEGES OF THE AGRICULTURAL BUREAU.

A paper read by Mrs. Stewart, of Taplan, at the special session for women at the Alawoona Conference:—"The advantages gained by a town or district possessing a Branch of the Agricultural Bureau are many, as may be seen by a glance through the official organ of the system, *i.e.*, the *Journal of Agriculture.* There is no institution doing similar service to those on the land, and particularly in outback districts, which gives the same return for the same cost to the member. Until a year or two ago Bureau membership was absolutely free, and, in addition, the monthly *Journal* was forwarded to each member, also free. At present a charge of 2s. to each household containing a member is made to cover the cost of the *Journal.* The value of this paper is a great deal more than this small amount. It is full of interest and help to those on the land, and contains not only the ideas of departmental officers, but through Branch meeting reports the ideas of farmers and their wives from all parts of South Australia.

The social aspect of the Bureau also is one of its main features. Members get together to discuss their problems with each other and derive great benefit thereby. If they cannot arrive at any satisfactory conclusion to their problem, the services of the department is then at their disposal for the cost of a stamp for a letter. In our Branch the idea of a social evening after every other meeting has been carried out for the past two years with very satisfactory results. This has had the effect of fostering considerably more interest in the Branch, especially for the young people who want a little more inducement than just the ordinary Bureau meeting. This is not only the case with the younger members, the older ones enjoying it and everyone has quite a good time. Supper is served and a collection taken to cover hall hire, any surplus going to augment the funds of the Branch. The hall hire for meetings is the only expense Branches have and the raising of funds for the purpose is a matter for each individual Branch to do as they think best. An idea for the purpose carried out by the Taplan women was a sale of gifts. Each member brought something and each bought something. This proved quite a good idea. Another suggestion is to make a levy of a small fixed amount.

Papers by members is one of the main sources of gaining and imparting knowledge on the various subjects confronting the country women, as it is in the discussion that usually follows the reading of a paper which brings forward the views of most of those present. Thus we have not only the views of the writer, but of others who in many instances are able to enlighten the writer of the paper on certain points. Opinions differ, and the writer of a paper does not necessarily have the best ideas on the subject under discussion and can therefore quite often gain advantages in the writing of a paper as well as in listening to one being read.

Another interesting and instructive item for a Branch meeting programme is a "Question Box." This is conducted by each member writing out a question on which enlightenment is required. These are drawn by each member who is expected to answer to the best of her ability. The question is then open for discussion by the members. When a question is asked on which further advice is required, it may be submitted to the head office of the Agricultural Bureau for answering by various officers whose services are always at the disposal of members for this purpose.

The advantages of the Agricultural Bureau are many. The great wonder is that so many farmers and their wives do not avail themselves of this gratis information of the Bureau.

JOURNAL
OF THE
Department of Agriculture
OF
South Australia

VOL. XL. FEBRUARY, 1937. No. 7

Published Monthly by the Department of Agriculture Edited by H. C PRITCHARD

	Page
Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836-1936	549-561
Some Points of Interest Concerning Kangaroo Island	562-570
Championship Wheat Crop Competition	571-578
Mottle-Leaf of Citrus	579-585
Seed Wheat from Crop Competitions, 1936-37	586-587
Egg-Laying Competitions	589-590
Advisory Board of Agriculture	592
Rainfall Table	595-596
Bureau Reports	597-598

WOMEN'S BRANCHES.

Bureau Reports 598

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1937

Mid-North, at Koolunga, Thursday, 11th March (Mr. J. W. Sykes, Koolunga).

South-East (Upper), at Bordertown, Wednesday, 17th March (Mr. L. H. Butler).

Yorke Peninsula, at Stansbury, Wednesday, 24th March (Mr. H. W. Cornish).

South-East (Lower), at Coonawarra, Wednesday, 14th April (Mr. John M. Kain).

Dairying, at Lobethal, Thursday, 13th May (Mr. B. Schapel).

River Murray, at Waikerie, Thursday, 17th June (Mr. F. B. Harden).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.					
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	
1937.	Jan.	March.	Jan.-Feb.	Jan.-Feb.	June-July.	
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*London Sales.*
Jan. 21..	5 6	5 4½	5 7⅞	5 2⅛	5 3⅜	Parcel; New South Wales, 4,000 tons (Jan.), 5s. 4½d.
Jan. 28..	5 3¾	5 2¼	5 5⅛	4 11⅛	5 2¼	
	Feb.		Feb.	Feb.-Mar.	June-July.	
Feb. 4..	5 4½	5 3¾	5 7⅞	5 1½	5 3	3.2.1937—Parcels—South Australia or Western Australia 8,800 tons (April), 5s. 2⅛d.; New South Wales or South Australia 7,500 tons (April), 5s. 1⅞d. Cargo—Australian, for Far East, and parcel, La Plata 50,000 tons for Germany, prices not disclosed. 4.2.1937—Parcels—South Australia 7,200 tons (March), 5s. 3⅝d., and 7,100 tons (Feb.) 5s. 3⅜d.; Victorian 750 tons (March), 5s. 4⅜d.; South Australia or Victoria 8,800 tons (Feb.), 5s. 3⅜d.
Feb. 11..	5 6¾	5 5¼	5 9⅜	5 2¼	5 3	Parcel—Western Australia 7,500 tons (March), 5s. 4½d.

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Vol. XL. FEBRUARY, 1937. No. 7

Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By Arthur J. Perkins, Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 486.)

THE FIRST DECADE, 1836-1846.

CHAPTER II.—(continued).

Sale of Town Acres—"Delayed Country Surveys"—Light's Explanation—Alleged responsibility of Commissioners for delays—Exaggerated influence ascribed to delayed surveys—Some advantages of delayed surveys—Farming handicaps of Pioneer Emigrants—Victims of delayed country surveys—John Barton Hack—Kingston sent to England—Progress of country surveys.

As the 1837 seeding months sped aimlessly by, gladdened neither by sowers nor seed, the two official observers chiefly concerned—the Resident Commissioner (J. H. Fisher) and the Surveyor-General (Colonel Light)—were apparently driven into panic decision by the menacing clamour of "a rapidly inflowing population,"(15) preponderantly agricultural or pastoral in outlook. Land for the plough, and grazing for sheep and cattle, had been paid for in cash many months past; and land for such purposes was now insistently demanded. True, such land was actually in the course of preparation; had been so indeed even before the arrival of the *Buffalo* in Australian waters: 29,000 acres around

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(15) *South Australian Register*, 2nd January, 1841, page 3, column 6. On the 1st January in each of the following years the population of South Australia was estimated as follows:—1837—200; 1838—3,000; 1839—6,000; 1840—10,000; 1841—15,000.

Rivoli Bay had been completed in January, 1837(¹⁶); and sections immediately adjoining the city acres had been taken in hand by surveyors early in the same year. Nevertheless the inadequacy of the staff and material efficiently to meet both present and rapidly rising prospective requirements had become painfully obvious: nor could effective remedial measures be applied except with the active co-operation of distant Colonisation Commissioners, whose devotion to cheese-paring was only too well known to those two harassed officials. Unpalatable correspondence, in their experience, after the lapse of a twelvemonth, would but lead to delaying replies when it was immediate action that was required: hence in their dilemma they fell back upon the fatal decision—fatal to both of them eventually, although, it may be, indirectly only—to confront their London overlords with the truculent assurance and knowledge of local requirements of the Deputy-Surveyor — George Strickland Kingston — in the hope that what no letters could do, the latter's forceful presence would secure to them prompt assistance in the form of money, material, and men for a hard-pressed Survey Department. Accordingly, with Kingston aboard, the *Rapid* set sail on 5th June, 1837, reaching England on 5th November of the same year.(¹⁷) By the same vessel travelled a despatch of Governor Hindmarsh addressed to the principal Secretary of State for the Colonies — Lord Glenelg — in which among other complaints it was pointed out that "even the sailing of the *Rapid* was not communicated to him" — the Governor — "till long after it was generally known in the province."(¹⁸) The situation was not without its ironies: there was, it seemed, a secret clause to Kingston's brief, of the existence of which even Light might not have been aware: it provided that whilst attending with due diligence to the urgent requirements of the Survey Department, he should, when opportune, assume the guise of the Resident Commissioner's Ambassador, and press for the immediate recall of Governor Hindmarsh! On the other hand, but four days prior to the departure of the *Rapid*, Hindmarsh had written strongly pressing upon Lord Glenelg the urgency of dismissing Kingston, on the grounds of professional incapacity and studied insolence to Her Majesty's representative;(¹⁹) and five days earlier he had urged similar action relative to J. H. Fisher on the grounds of repeated insults to Her Majesty's representative, and illegal detention of a Government tarpaulin required by the Governor for other purposes.(²⁰)

George Strickland Kingston.
(*By courtesy of Archives.*)

Meanwhile notwithstanding the prolonged absence of the Deputy-Surveyor, who, although accused of incompetence by his colleagues(²¹) and the Governor,

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(¹⁶) *South Australian Register*, 19th May, 1838, page 6, column 3.
(¹⁷) *The Foundation and Settlement of South Australia*, by A. G. Price, page 76.
(¹⁸) Governor Hindmarsh to Secretary of State for the Colonies, 3rd June, 1837 (Despatch No. 27).
(¹⁹) Governor Hindmarsh to Secretary of State, 1st June, 1837 (Despatch No. 23).
(²⁰) Governor Hindmarsh to Secretary of State for the Colonies, 31st May, 1837 (Despatch No. 19).
(²¹) *South Australian Register*, 7th July, 1838, page 2, column 4.

had been described by an anonymous correspondent of the *Register* as "one of the most active and efficient of the party,"([22]) the twelve succeeding months were not altogether unfruitful from the standpoint of both Survey and impatient prospective settlers. Early in 1838 Light was able to announce that in his opinion there was enough land surveyed to satisfy the requirements of the holders of preliminary Land Orders. But unfortunately both he and Fisher appeared to have overlooked the fact that unlike the final choice of the site of the capital city, the selection of country sections was not left in final issue to the arbitrament of the Surveyor-General, but to the individual decisions of the holders of 437 preliminary Land Orders, who had been definitely promised priority of choice, as far as was practicable *throughout the Colony.* In the circumstances it could not be said that an offer of 60,000 acres when 59,000 were required, gave much scope for selection; particularly as the area offered was confined to the neighbourhood of Adelaide, and portion of the coastal southern districts between the capital city and Cape Jervis.

It was true that taking everything into consideration, Light could probably not have chosen country more suitable for the first settlement of farmers, whose experience had for the most part been acquired on relatively small livestock farms, and under moist conditions of climate: it would indeed have been unwise, if avoidable, to bring such settlers from the outset face to face with the difficult problems of low rainfall conditions. Throughout these southern coastal areas, which included well wooded hills of moderate heights, rainfall conditions were obviously satisfactory: water was obtainable almost anywhere without great difficulty: and if portion of the hills were too rugged for cultivation purposes, the district abounded in rich sheltered valleys and fertile foothills and plains. One hundred years' experience of these areas had confirmed Light's judgment in the matter: these districts had proved eminently suitable to dairy farming, to fruit growing, to small farms upon which farm crops could be profitably associated with minor livestock operations. Within recent years, too, much of these southern lands which at one time had been considered more or less unproductive, had been converted into valuable pastures.

It was no doubt sound policy, too, to endeavour to make land settlement extend progressively from a central capital city, with its markets, its warehouses and shops, and its facilities for technical assistance and advice when required: adequate means of communication could in such circumstances be more readily maintained between city and country lands. Concentration in settlement could also be said to have provided the best possible means of defence against runaway convicts and potentially hostile natives.

But all these advantages could weigh but little against the spirit of adventure that was abroad, and particularly so when faced with flagrant violation of the principle of priority of choice anywhere in the colony. Moreover, the distant River Murray, the finest waterway that the island-continent could boast of, seen as yet by the few but known by repute to the many, had cast a spell over the imaginations of intending settlers ever since its epochal discovery by Sturt in 1830. "That magnificent River," wrote a correspondent of the *Register*, "is the very feature above all others that stamps South Australia as immeasurably superior to the older colonies of New South Wales and Van Diemen's Land. It will be the great highway in a few years of most of the wealth and commerce of the country: and the prowling canoe and the rank and unprofitable reeds of Lake Alexandrina will presently be surrounded by the busy hum of cities and the never failing results of cheerful industries."([23]) Settlers were as yet unacquainted with the low rainfall conditions obtaining over the country

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([22]) *South Australian Register,* 3rd June, 1837, page 4, column 1.

([23]) *South Australian Register,* 10th March, 1838, page 3, column 2.

through which the Murray slowly wended its way to the sea, and with the defective qualities of its soil; and they were apt to picture this country as the future site of numerous prosperous farms and rich grazing lands.

Hence, following upon a meeting convened by the Resident Commissioner on the 20th February, 1838, to settle the method that should be adopted to determine the order in which the preliminary country sections should be selected, and the subsequent fixing of 1st March, for such selection, Thomas Bewes Strangways, Colonial Secretary, sometime prospective son-in-law of Governor Hindmarsh, and owner of twelve preliminary Country Land Orders, secured an injunction from Judge Henry Jickling restraining James Hurtle Fisher, his agents and servants, from holding the meeting advertised for the 1st March, or any meeting whatever for similar purposes, until such time as not less than 100,000 acres, situated in different districts of the province had been duly surveyed and mapped out.

Governor Gawler.

(By courtesy of Archives.)

Thus ironically enough, some few months back the Survey Department had been held up to public obloquy for unduly delaying the delivery of land to intending settlers: but no sooner was it announced that such land had been duly surveyed, and would shortly be made available for settlement, than a new and effective obstacle to early delivery was raised by a section of the settlers for their own selfish ends. It was undoubtedly true that they had been promised unwisely by the Colonisation Commissioners the first pick of the land throughout the Colony: but in order to make sure of securing the very best sites in a vast and unknown country, careful exploration and lengthy consideration would obviously have been needed; and they thought themselves well within their rights in claiming all the time that might be needed for such purposes, irrespective of the inconvenience and loss it might entail upon less fortunately situated would-be settlers. Eventually, however, and under probable pressure of their erst-while allies in the campaign against an allegedly inefficient Survey Department, they came to recognise that a rash promise made in all good faith in Great Britain to a select minority, could not necessarily be implemented in Australia against the obvious interests of the great body of intending settlers, namely, the immediate throwing open for settlement of all land that had been surveyed for that purpose: and hence they accepted with scarcely hidden alacrity a commonsense compromise suggested by J. H. Fisher and to the following effect—(*a*) "that preliminary purchasers should immediately proceed to determine their order of choice"; (*b*) that those desirous of taking up sections in the recently surveyed districts, should after due inspection of the land, indicate the sections of their choice, when immediate steps would be taken by the Survey Department to have the selected sections staked out in blocks of 134 acres; (*c*) that those wishing to reserve their selections for districts as yet unsurveyed would be at liberty to do so.(24)

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(24) *South Australian Register*, 24th March, 1838, page 3, column 2.

As shown in a map attached herewith, the good rainfall country originally set aside by Light for earliest settlement, was divided into six districts, extending between Adelaide and Cape Jervis, and numbered respectively as follows:—A (the Adelaide district), B, C, D, E and F (the latter two districts embracing the country between Cape Jervis and Hindmarsh Island). Two additional districts were set out on Kangaroo Island, namely, G and H.

On 18th May, 1838, Light, in a sworn declaration, affirmed that land surveyed and mapped out up to date was distributed as follows:—Around Adelaide, about 69,000 acres; about Rapid Bay, 27,000 acres; at Yankalilla, 5,400 acres; on Kangaroo Island, 20,000 acres; and in the valley of the Onkaparinga, although not at the time completed, 28,000 acres; or all told, close on 150,000 acres of land would shortly be available for settlement. And as on the 16th May, 1838, the owners of preliminary Land Orders had not selected or reserved more than 40,000 acres, it was computed that well over 100,000 acres should be available for occupation by ordinary settlers, so soon as the surveyors had completed the staking out of the sections. Hence there was every reason to believe that the regrettable land troubles would soon come to an end; and that all settlers, excepting those who preferred reserving their preliminary Land Orders for districts subsequently to be surveyed, would soon be in definite occupation of their blocks of land: but the end was not quite yet.

William Giles, Second General Manager South Australian Company
[*By courtesy of Archives.*

Lord Glenelg, Principal Secretary of State for the Colonies (1835-1839)

On 21st June, 1838—after little more than 12 months' absence abroad—the *Rapid* returned home with G. S. Kingston aboard. It must have occurred at the time to those who had sent him to England ostensibly to solicit or compel assistance from the Colonisation Commissioners in the matter of these local land troubles, that the latter had been comfortably settled in his absence, and quite possibly because of his absence. In any event it was soon to be obvious that it was not peace, but war that he had brought back with him. By 23rd June, Governor Hindmarsh had received his letter of recall; by 6th July Colonel Light had resigned his office as Surveyor-General, to be followed almost immediately by the block-resignation of the whole of the Survey staff, who declined to continue work under an incompetent leader; and by October, J. H. Fisher had been superseded by Colonel Gawler in his Resident Commissionership. It would seem therefore that Kingston's efforts abroad had had certain boomerang-like effects, striking down foes and friends alike: nay, they spared not even himself, the thrower, the fomenter of trouble, who was compelled to leave the public service towards the end of October because Colonel Gawler, already Resident Commissioner and Governor of the State, preferred acting as Surveyor-General as well rather than promote to that exalted position a deserving Deputy-Surveyor.(25)

CHAPTER III.

Supposed loss of second consecutive season—Sealer and whaler settlers of Kangaroo Island—Exaggerated expectations as to mean grain yields—Early agricultural efforts of the South Australian Company—Light's early but unsuccessful importation of sheep—Rapid Bay vegetable garden—Stevenson's first address on Early Agricultural Experiences.

It was obvious that the late delivery of land to settlers in 1838 had rendered impossible an agricultural campaign of any consequence in the 1838-39 season: and this in the opinion of some writers represented the second consecutive season lost to a community of farmers and graziers since its arrival in the province. But as we have already had occasion to suggest, such a view would seem to imply a misinterpretation of the facts that mattered: for, viewed in the right light, the absence of large scale agricultural operations in seasons 1837-38 and 1838-39 might well be said to have protected rather than destroyed the substance of the majority of the settlers. That the ill-disposed among them should have eaten into their capital in idleness or in rash speculation could not materially affect the position, except in so far as individual spendthrifts were personally concerned. A more valid objection, perhaps, was the fact that a community but ill-supplied with ready cash, and as yet without basis for reasonable credit accommodation, was obliged to make cash payments, or else undergo onerous discounts, for foodstuffs and provisions, which in other circumstances might have been locally produced: the position, moreover, was aggravated by the fact that in these earlier years of settlement, exceptionally high prices obtained—flour, for example, varying in price from £30 to £60 and £70 per ton, and bread selling at 3s. per 4lb. loaf—whereas unfortunately, later on, when both wool and wheat were available for export, the prices of agricultural products generally tended to fall below costs of production. But against whatever advantages might be claimed for early land settlement and general cropping—say in the autumn of 1837—must be set from the standpoint of intelligent and observing farmers the inestimable boon of progressively acquired climatic experience, and acquired at no great cost to individuals or community: corresponding experience, on the other hand, would have made far greater inroads into the resources of farmers and led to a greater sum of suffering and misery than two years of watchful waiting, had such experience been acquired through the medium of large scale farming operations, started by all and sundry in 1837-38 and continued in 1838-39, with nothing better to guide "new-chum" settlers than British, New South Wales, or Van Diemen's Land farming experience; if indeed the latter two would have been readily accessible, and if so, acceptable to hard-headed farmers.

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(25) Governor Gawler to Secretary Colonisation Board, 16th October, 1838, and 14th March, 1839.

As historically speaking, we have now reached the stage at which settlers would be preparing to take up their country sections, it should be of some interest to note what records have been left to us of their ponderings and doings during the preceding two years of "watchful waiting." In the first place, reference should undoubtedly be made to the earliest South Australian agriculturists known to us, namely, the sealers and whalers—and some add "escaped convicts"—found on Kangaroo Island, first by Samuel Stephens and his band of the South Australian Company's employees, and subsequently by Light and his Surveyors. According to John Stephens—subsequently third editor of the *Register*—"they were described by an early settler as 'intelligent, quiet men, having spots of land under cultivation; growing a little wheat, with potatoes, turnips, and other vegetables for their own consumption' . . . . 'I went,' says the same settler, 'with Mr. Kingston up the river . . . . to a place occupied and cultivated by two of the sealers: . . . . they have about five acres under cultivation and grow potatoes, turnips, cabbages, water melons, onions, wheat and barley. The vegetables were all good. We purchased turnips from them at 6d. per dozen. Their wheat is excellent, although grown five successive years without changing the seed and on the same land. I think they said it weighed 64lbs. to the bushel, and they got last year, in quantity, 70bush. from about 1½ acres.' "(1)

The latter statement leads me to say that in perusing the records of the first seven or eight years of South Australian colonisation, one cannot help but be astonished at the exceptional mean grain yields per acre—usually pre-harvest estimates—with which one is repeatedly confronted: very few crops it appeared were expected to yield less than 40bush. to 50bush. to the acre; and some considerably more. Such estimates were usually supplied by imaginative editors, fighting their own or their country's cause against detractors; but sometimes by farmers, possibly with a farm to sell: my own conclusions in either case had been that zeal appeared to have run away with imagination, or that knowledge of measurements and figures had been sadly at fault in those days. The first confirmation of the accuracy of such conclusions was given to me in the following extract of an 1844 *Register* editorial:—

"Great mistakes we believe have been made"—and few greater than those of the self-same able editor—"in estimating the acreable produce of wheat in this Colony: some estimating it at 20 to 30 bushels per acre: and others deceiving themselves with the fallacious hopes of reaping from 25 to 30 bushels per acre. Our own opinion is, taking the crops of the Colony round, that *from* 16 *to* 18 *bushels per acre is the maximum quantity*: and without great improvement in farming that greater quantity than from 16 to 18 bushels per acre is not to be expected. Cases we know have occurred in which parties in the neighbourhood of Adelaide have obtained from 22 to 25 bushels per acre: and where economy has been used both at seed time and harvest, a small profit has been realised: but these instances are rare and not to be strained into a fixed application to the general agricultural interests of the province."(2).

In the matter of the Kangaroo Islanders' estimated mean yield of wheat going 46 to 47 bushels to the acre and weighing 64lbs. to the bushel, there was this much to be said, that in those days the sealers and whalers could but practise spade husbandry on their small plots of ground—or was it their black wives who did all the work?—and spade husbandry in efficient hands could be made to return appreciably more than the more expeditious horse and plough husbandry, to which we have become so much wedded as to imagine that none other could exist in a practical world, apart perhaps from the slightly less efficient tractor and plough husbandry; but if we should grant so much to the islanders, how are we to credit these primitive agriculturists with the ability and the means to determine with any degree of accuracy mean grain yields per acre, and far less the actual weight per bushel of such grain? It may be that we have here yet another illustration of the romance effects of a judicious combination of unlimited zeal and imagination.

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(1) *History of South Australia,* by John Stephens, page 26.

(2) *South Australian Register,* 10th April, 1844, page 3, column 1.

The South Australian Company's officers and men headed by the Colonial Manager—Samuel Stephens—were the first of the pioneers to enter Australian waters, and to land on Kangaroo Island, the three vessels conveying them thither, having preceded the arrival of Colonel Light and the *Rapid* on 20th August, 1836, by four to 24 days respectively. They are stated to have taken early steps to emulate the sealers and whalers in establishing gardens and cultivating the soil generally. In his reminiscences W. L. Beare, son of Thomas Hudson Beare, at the time second officer of the Company, stated that Charles Powell, gardener of the Company, planted fruit trees, olives, and vine cuttings, nearly all of which grew: he also planted a mulberry tree on the island which had come out on the *Duke of York.*(3) Later on, some time in January, 1839, we find William Giles—subsequently Manager of the Company—reporting to the London Manager in the following terms:—

"Our crops of potatoes, I am sorry to say, have failed owing to the long drought during the spring, which I understand is a very uncommon experience. I had hoped to have grown enough for our own consumption, and to have sent some over to Adelaide, but am disappointed. I have already ascertained that we must cultivate our low flat land, and not think of farming on the hills; the heat of summer parches everything upon the high ground. We have got about 30 bushels of very good wheat, and a very good sample of barley has been grown on the banks of the river."

" . . . . When at the Cape of Good Hope"—*i.e.*, on the outward voyage—"Mr. Dixon was so kind as to give me 300 cuttings of Constantia grape; and with the most incessant care during the last twelve months only five of them are now living. This year he has sent three thousand, one thousand of which I have kept at Kingscote, and sent two thousand over to Adelaide: with these later ones I hope to be more successful. I have now growing in the garden and looking healthy, apple trees, pears, cherries, plums, raspberries, currants, peaches, nectarines, apricots, guavas, pomegranates, almonds, grapes, lemons, limes, oranges, citrons, and loquats. An old friend from Van Diemen's Land has sent me a great many trees of the above sorts, and some have been obtained from Sydney."(4)

In his original instructions Colonel Light had been specially charged by the Colonisation Commissioners to take early steps to land two or three gardeners on Kangaroo Island, and to set them to work on a vegetable garden, the produce of which would be for the general use of the colonists: and this no doubt was a wise and proper precautionary measure in anticipation of a probable outbreak of scurvy after long sea voyages. Indeed, Light himself was to experience the effects of the malady on the men in his charge. "The necessity," he wrote in his Journal on the 5th December, 1836, "of getting fresh provisions increases daily: at Rapid Valley nine labourers out of fifteen are hardly able to do anything from scorbutic sores on their feet and ankles: another has a finger which I fear must eventually come off, having pricked it with a fish-bone; one of my boat's crew on the 26th November hurt his fingers between two pigs of ballast, and his hand is now so bad that I much fear that he will suffer some months; and out of a small ship's company there are five with swelled feet and ankles, besides a number at Holdfast Plains suffering from the same causes. These cases will, I hope, convince the Commissioners that I have only acted for the best in sending for fresh stock from Hobart Town."

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(3) It is understood that this mulberry tree planted by Charles Powell in 1836 is still alive on the island to-day (1937).

(4) William Giles to Edmund Wheeler, undated, probably some time in January, 1839.

Poor conscientious Light! Yet another burden for his overladen pack! He knew full well the penury of his employers—the Commissioners—as well as their desire that as their chief representative for the moment he should husband their resources to the utmost: but he owed a duty paramount to the men he had led out into the wilderness: "they had been for seven months on salt provisions" and were suffering severely from so unnatural a diet. In the circumstances Light took the only course apparently open to him: he chartered a ship and sent for 800 sheep from Van Diemen's Land: unfortunately on the return journey the vessel met with boisterous weather and the captain was able to land on Kangaroo Island but few live sheep.

A Sheep Station in the Fifties.
[*From sketch by S. T. Gill.*

Colonel Light does not seem to have taken any pains to honour the instructions of the Commissioners and establish a vegetable garden on Kangaroo Island: and the reasons for this apparent dereliction of duty would appear to have been as follows: firstly, because he had already decided that the island was quite unsuitable for purposes of early settlement; secondly, because if such a garden were ever a necessity in that particular locality, its establishment and management could very well be left to the South Australian Company, whose employees were already settled on the island; and finally, and perhaps mainly, because he distrusted Samuel Stephens and his men—and as subsequent events proved, with very good reason—and he feared to expose his own men to damaging contamination.

But, when later on in the course of his examination of the adjoining mainland, or the "main" as it was invariably termed in those days, Light came across Rapid Bay he seemed to have been particularly impressed by the picturesque beauty of its natural surroundings: and since he did land a gardener in this locality, who succeeded in establishing an excellent vegetable garden, which was subsequently "tended by Kangaroo Island sealers and Encounter Bay natives"(5) we might perhaps agree with those who asserted that at one time Colonel Light did toy with the idea of establishing the Capital City in the neighbourhood of Rapid Bay: although eventually he came to recognise the superior claims of the banks of the Torrens.

I make no apology for the lengthy extracts that are given below: nor indeed do they stand in need of any: they are taken from an address delivered by George Stevenson, Editor of the *South Australian Register,* and sometime Private Secretary of Governor Hindmarsh, at the Adelaide Mechanics' Institute, on the 29th September, 1839, and reproduced in the Royal Australian Almanack of 1840.

" . . . . So far as experience can warrant predictions, I think there cannot remain a doubt that South Australia is eminently calculated for the growth of all the grains and productions of colder climates, and of many of the most valuable of a warmer zone."

" . . . . At this moment (27th September) it is within a few days of three years since the first pioneers from England landed in this province, and many of us recollect the fine potatoes and onions grown by the sealers at Kangaroo Island, and exhibited to us soon after landing, scarcely more acceptable to the palate after a long sea voyage, than as proof of the fertile land we had reached. One of the first things done by the Surveying party at Rapid Bay, was the formation of a small garden, the produce of which was abundant. After the station was deserted in February, 1837, part of its crop remained, and Mr. Field called at the Bay on his passage to Sydney, and procured a supply of fine potatoes from the spot. We recollect the pleasure with which we saw about the same period the fine water melons raised by Dr. Everard in his garden at Glenelg; and soon after the appropriation of the town allotments in March of that year, there might be seen in front of Colonel Light's old residence, in the South Australian Company's garden, in North Terrace, in Mr. Gray's and Mr. Hill's, near the Western Terrace, as fine samples of vegetables as could be produced in any part of Europe. The difficulty of procuring materials for fencing at that period—the stringy-bark forests were then undiscovered—and the hopelessness of excluding the armies of marauding pigs which infested the location, prevented most persons from attempting gardening on anything like an extensive scale. Mr. Allen, however, by the aid of a partial enclosure, and by careful watching, succeeded in growing during that season several thousand melons. Mr. Hack's more extensive gardens in North Adelaide, then partially enclosed, also produced melons and a tolerable crop of other vegetables; my own garden, in the same neighbourhood, also then but partially fenced, suffered a good deal from the pig nuisance, but the vegetables that were left satisfied me that there was no reason to fear ample success on that score. I am now speaking of the results of the seasons of 1837 (1836-37) and 1838 (1837-38), which may be said to close about April of the latter year."

Adverting to the last sentence in the above quotation, it was worth noting that after careful observation extending over nearly three successive seasons, George Stevenson, who was an expert gardener—indeed he has been called the "Father of South Australian Horticulture"—was already able to discern that in South Australia the agricultural year, or season, opened in April—the time of sowing and hope and the green braird—and closed with March—the crowning days of fulfilment, fruition, and the falling leaf. To us, whom long familiarity had rendered such knowledge more or less instinctive, these facts might appear trivial: nevertheless they were the fundamental factors upon which, consciously or unconsciously, every agriculturist based all his cultural operations: nor could they have been established with workable accuracy except by the careful study of the capricious procession of several successive seasons. This, then, was one of the boons bestowed upon pioneer settlers, at little or no cost to the community, by the much decried delays in country surveys.

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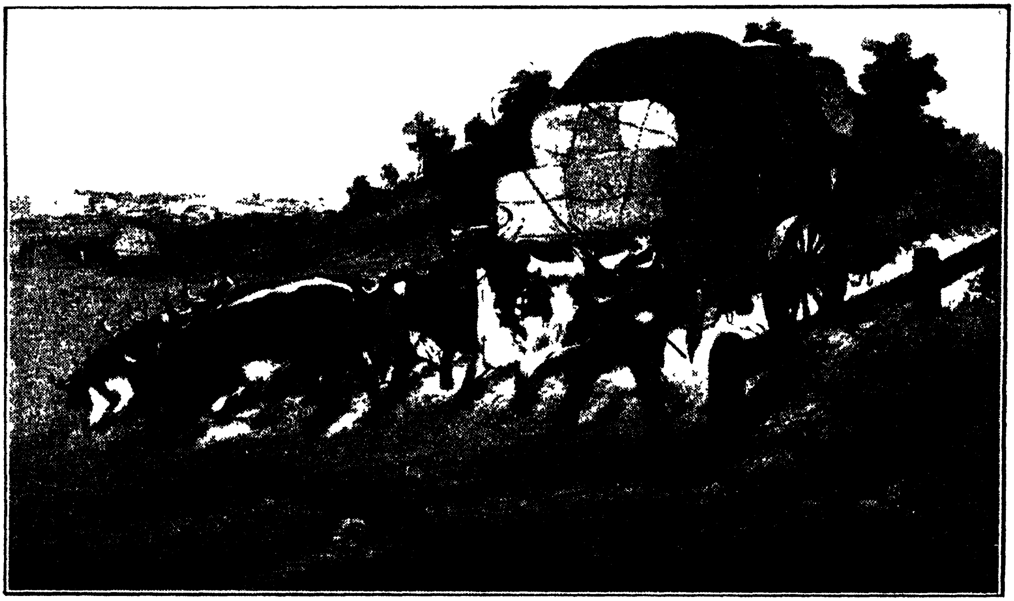
(5) *The Foundation and Settlement of South Australia,* by A. G. Price, page 119.

"I now come to a season of very singular description, and in speaking of it we cannot, of course, refer to personal experience of a tract of years; but we may arrive at a just conclusion by facts drawn from the neighbouring colony of New South Wales. Is is well known that that portion of New Holland has occasionally been afflicted with seasons of severe drought; and it may be naturally supposed that, lying nearly in the same parallel of latitude, South Australia may in such seasons suffer from the same cause. That it has done so during the last year, there is no doubt; but when we compare the *degree,* we shall find little cause to apprehend any season of such general and melancholy sterility as our less fortunate neighbours to the eastward have been doomed to undergo. The season of 1837-38 was regarded generally as deficient in the usual quantity of rain. The crops of that season in New South Wales, however, were, I believe, about an average, and no great alarm was felt for the future. In South Australia during the same season, the rains were in sufficient quantity. Some of us remember the state in which the Torrens continued for weeks, and through the whole season, from May, 1837, to January, 1838. There was not an interval of three weeks in which refreshing showers ceased to fall. During that month, however, and through the February following, no rain fell; but it returned in March, not in the torrents of the preceding year, but continuing at favourable intervals, and in sufficient quantity throughout the winter months of May, June, July, and August. From this time till the end of the succeeding May refreshing showers fell frequently at intervals of a week or two. On the 1st June, the winter rains commenced, and the abundance we have had since renders it unnecessary further to particularise dates.

"I am thus minute for the purpose of directing your attention to the important fact that during the whole of the period from May, 1838, to the same month of the present year, rain has scarcely fallen at all—for some months not a drop has descended—in the colony of New South Wales. Recently we have all rejoiced to learn that the fear of another season of sterility in that fine country has been removed; but the calamity of the past season has been a dreadful one. Sheep and stock have perished in great numbers; the maize crop was a perfect failure, and the wheat crop was little better. Indeed the best proof of the lamentable return of last season's produce is to be found in the present famine price of these articles at Sydney—in the rise of flour from £15 per ton to £70, and in maize from 3s. a bushel to 14s.

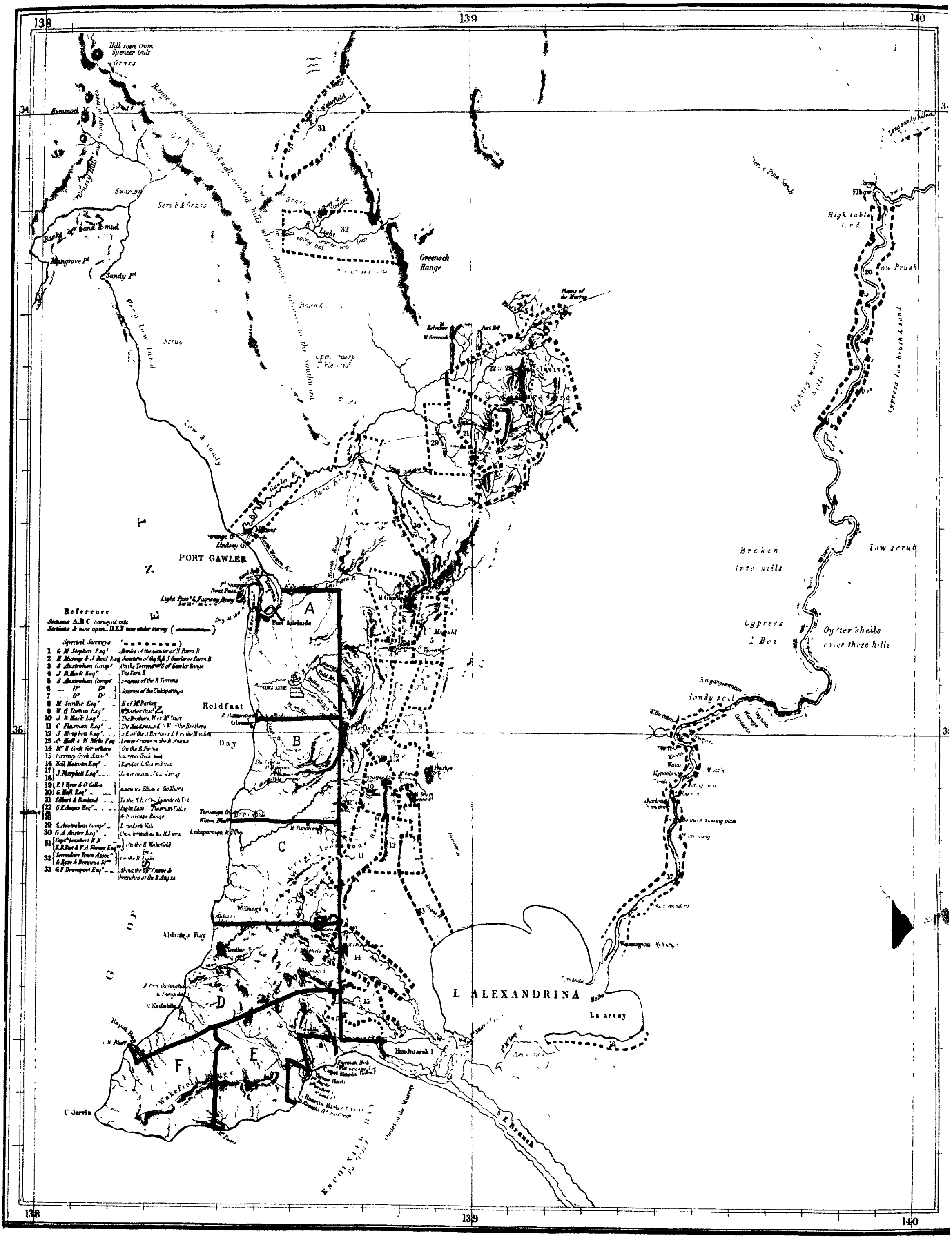
"Let us, on the other hand, turn to the state of the products of South Australia during this sad visitation, of New South Wales.

"We have seen that the rain descended during the winter months if not in tropical abundance, at least in sufficient quantity for all agricultural and gardening purposes; and that it was only during what is, in the best seasons, the dry period of the year, that there was any perceptible deficiency. The cattle and sheep were dying beside the exhausted water-holes of New South Wales, while those of South Australia had their living springs and running brooks to resort to. The plains of New South Wales were dust, while the pasture ranges of South Australia were covered with herbage. While we were in the plenteous enjoyment of the refreshing rains of November, our neighbours were preparing for a day of solemn fasting and prayer to the Almighty to open the windows of heaven and to avert the sterile curse with which the country was then afflicted. In speaking of our crops of grain, I cannot boast of more than patches of the produce of last year; but such as they were—I can speak from my own observation, and many of you now present know the facts—I have seen no finer samples of wheat, barley and oats, in any part of the world than were produced last season in the immediate neighbourhood of Adelaide. The wheat, grown without manure, in fact upon the sod twice turned over''—or, in other words, on land ploughed and cross-ploughed for the first time since creation—''was carefully measured, and the produce was at the rate of 53 bushels per acre. It was the Egyptian or seven-eared variety. The same care was not taken in ascertaining the produce of the oats and barley, but both were considerable. The maize crop on the same land, was very indifferent; but in situations better adapted to the growth of this important grain—such, for instance as the alluvial flats on the lower Torrens—it succeeded admirably. On Mr. White's farm a few miles below Adelaide, it grew last season with a luxuriance far surpassing anything known in New South Wales. In the few gardens that were enclosed around Adelaide last season, there was no reason to complain of a scanty crop of vegetables. My neighbour, Mr. Samuel Stephens, had an abundant supply of turnips, peas, onions, and cabbages. Mr. Stephens also succeeded in raising a fair sample of Talavera wheat; and I believe was also very successful with the water and sweet melon; and for myself I raised about 800 melons of various sorts, on less than quarter of an acre of ground. The largest water melon weighed 18lbs.; the largest sweet melon, a variety from the West Indies, weighed 12½lbs. But I wish to mention here a circumstance connected with a letter which was published in



Carting Wool in the Fifties.

[*From sketch by S. T. Gill.*


138
139
140
34
35
Hill seen from Spencer Gulf
Grass
Hummock M.
Range of moderately wooded hills
Swampy
Scrub & Grass
Banks of sand & mud
Mangrove Pt
Sandy Pt
Very low land
Scrub
Low & sandy
Grass
R. Light
32
31
Wakefield
Greenock Range
Plains of the Murray
Belvidere
M Gawler
Gawler R.
Para R.
29
30
PORT GAWLER
Lindsay Cr.
Pt Snapper
Boat Pass
Light Pass & Fairway Buoy
Dry at low water
Port Adelaide
A
Holdfast
Glenelg
Bay
B
C
D
E
F
Tortunga Cr.
Witton Bluff
Onkaparinga R.
Willunga
Aldinga Bay
Rapid B.
C Jervis
Wakefield
Encounter Bay
Hindmarsh I.
L ALEXANDRINA
La artay
Mt Barker
Mount Lofty
High table land
Low scrub
Broken into hills
Cypress & Box
Oyster shells over these hills
Sandy soil
Cypress low brush & sand
Pine Scrub
Elbow
Reference
Sections A.B.C surveyed into Sections & now open. D.E.F now under survey
Special Surveys
1 G M Stephen Esqr — Banks of the water of N Para R
2 H Murray & J Reid Esqs — Junction of the N & S Gawler or Para R
3 S Australian Compy — On the Torrens S of Gawler Range
4 J B Hack Esqr — The Para R
5 S Australian Compy — Sources of the R Torrens
6 Do Do — Sources of the Onkaparinga
7 Do Do
8 M Smillie Esqr — E of Mt Barker
9 W. H Dutton Esqr — Mt Barker Dist
10 J B Hack Esqr — The Brothers W of Mt Sturt
11 C Flaxman Esqr — The Meadows
12 J Morphett Esqr
13 C Hall & W Mein Esq — Lower Course of the R Angas
14 Mr R Cock for others — On the R Finnis
15 Currency Creek Assocn — Currency Creek
16 Neil Malcolm Esqr — Lake Alexandrina
17 18 J Morphett Esqr
19 E J Eyre & O Gilles
20 G Hall Esqr — below the Elbow of the Murray
21 Gilbert & Rowland — Lyndoch Vale
22 to 28 G F Angas Esqr — Light Pass, Flaxman Valley & Barossa Range
29 S Australian Compy — Lyndoch Vale
30 G A Anstey Esqr
31 Captn Lambert R.N, E.B.Hart & W.A Slaney Esqrs — On the R Wakefield
32 Secondary Town Assocn & Eyre & Bonney's Sns — On the R Light
33 G F Davenport Esqr — About the Upr Course & branches of the R Angas
English Miles 69 One Degree
10
20
30
London Pubd March 1st 1841 by John Arrowsmith 10 Soho Square.

Ordered by The House of Commons to be Printed June 10th 1841

Plan showing First Six Divisions (A to F) of Light's Surveys of South Australia, extending due south of Adelaide to Fleurieu Peninsula. and special surveys (1-33) subsequently granted.

The Times newspaper some time ago, and which has created some discussion here as well as at home. That letter was written by the direction of an inhabitant of North Adelaide; by a neighbour of my own, a gentleman who is incapable of, and who could not be suspected of misrepresentation, or in fact, of doing more than merely conveying his actual impression of the soil and climate as they existed at the time. This gentleman arrived in the Colony in November, 1837—at the beginning of the summer—and he was naturally alarmed at the heat, and its effects on the soil around Adelaide, during the two or three months of the dry season; and in the letter alluded to the ground was described to be *'hard as bricks.'* Now, whoever has travelled in France, or Spain, or Italy, during the hot months of summer, and witnessed the effects of a few weeks of uninterrupted sunshine on the most fertile lands in Europe, and like my worthy neighbour not acquainted with any less humid land than his own, might speak of them as he did of South Australia. The rich valleys and plains of the south might have been all *'hard as bricks'*—it may all have been barren—from Dan to Beersheba. But the danger of hasty conclusion was never more effectively illustrated than in my friend's case. Last year—the famine year of Sydney—he had vegetables, melons, onions, cauliflowers, brocoli, in abundance . . . . . in his own gardens, ample proof of what can be done on ground *'hard as bricks.'*

" . . . Maize is, of almost all the cereal tribe, the least subject to diseased growth, and where alluvial flats are selected for its cultivation, it can never fail to be the most successful and remunerative crop of our province: in the average of seasons, I should say it is the best first crop on newly broken up land, whether alluvial or not, and far superior to wheat, of which, as a first crop on the turned over sod, it would never be safe to reckon on a return averaging from 10 to 20 bushels, while from 50 to 80 bushels of maize may be confidently looked for from the same ground. In October, 1837, I planted a small patch on the sod once turned over; the plants grew to an average height of 7ft.—some of them reached 9ft.—the cobs were not large, but the grain was fine; and the produce according to the most careful calculation I could make at the time and not including a portion destroyed by a night's inroad of a troop of swine, was at the rate of rather more than 60 bushels per acre. This, however, is not by at least one-half the amount of the return we may certainly expect on the soil more particularly adapted to the cultivation of this species of grain, when these soils have been twice turned over; and I trust its value as food for stock of all description, to say nothing of its use as a culinary vegetable, and as an agreeable occasional substitute for wheaten bread will induce our farmers to avail themselves of what must be the most lucrative and certain crop that can be grown.

" . . . . I now beg to direct your attention to another cereal of great importance, not merely because of its intrinsic value as an article of wholesome food—of great use in all establishments where horses are to be fed and poultry or pigs to be reared and fattened—but as a certain crop under all the fluctuations of the Australian climate, capable of resisting the extremest drought and heat, and productive in seasons and under circumstances when other grains would most likely fail. The grain I allude to is a variety of the *Sorghum*, or millet, but generally known in the West Indies as *Guinea Corn*. Though this be one of the smallest of the cereals, its abundant produce more than covers that deficiency, 100 bushels an acre being in the dryest seasons no extraordinary crop."(6)

Some remarks on the interesting extracts from George Stevenson's first address given at the Mechanics' Institute seem to be called for: but these will be reserved for the next chapter.

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(6) Royal South Australian Almanack, 1840.

(*To be continued.*)

Some Points of Interest Concerning Kangaroo Island

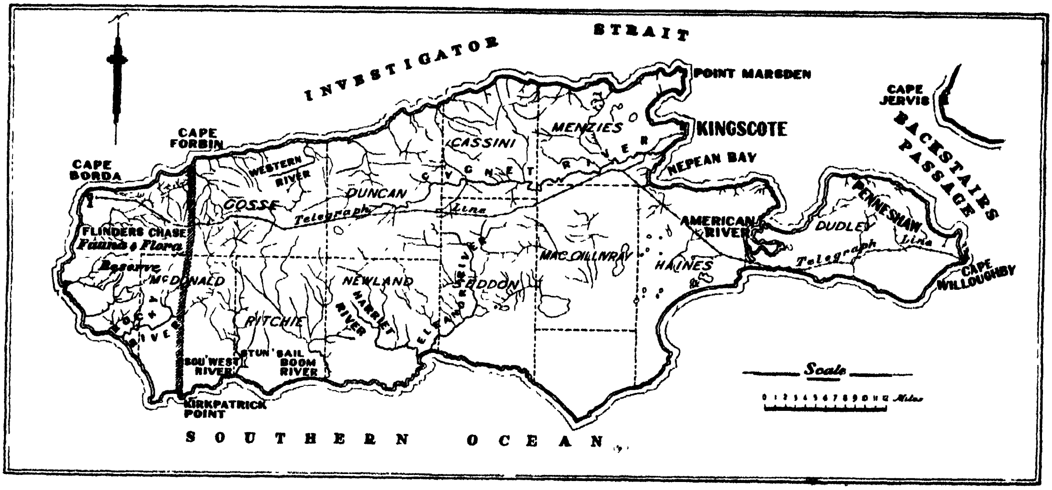
[By ROWLAND HILL, District Agricultural Adviser.]

During the Centenary Year of South Australia, the publication of the State's early history has been of great interest, and many of the earliest records are centred around Kangaroo Island. That so much attention should again be directed to that portion of the State one hundred years after the foundation of the Colony, emphasising its value for agricultural development, cannot be accepted as a tit-bit of the State's progress.

Situated on the southern side of Investigator Strait—approximately 30 miles south of Yorke Peninsula with Backstairs Passage about nine miles in width dividing it from the mainland—Kangaroo Island is approximately 90 miles wide from east to west and 30 miles from north to south at its widest point.

Of the total area, namely, 1,075,200 acres, 147,800 acres at the extreme western end, defined by an easterly boundary extending from Cape Forbin on the north coast to Kirkpatrick Point on the southern coast, have been reserved as a Native Fauna and Flora Reserve.

A plan of the Island reveals a multitude of watercourses and their even distribution. Many of the creeks and rivers are of no great length, and retain permanent water only adjacent to where they empty into the sea, but the more important provide very valuable water supplies throughout the year. Taking its rise in the hundred of Duncan, and being fed from the southern slopes of the hundreds of Cassini and Menzies, the Cygnet River—

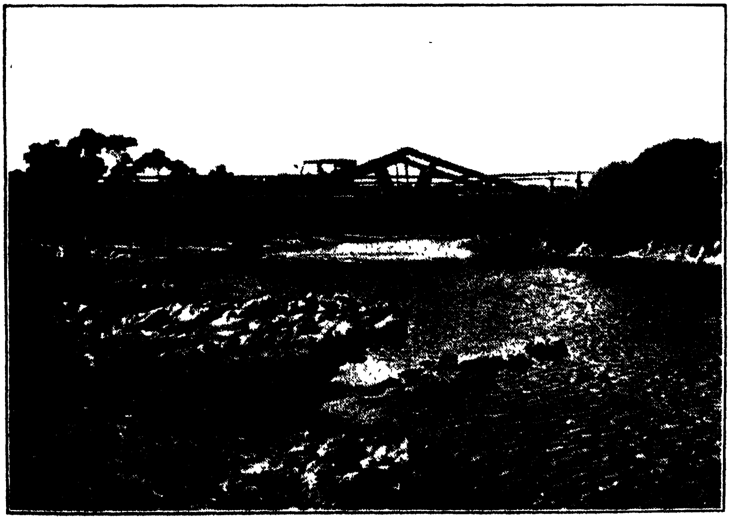


Map of Kangaroo Island, showing Hundreds, Rivers, &c., some of which are mentioned in the accompanying article.

approximately 35 miles in length—holds pride of place as the most important river.

In the somewhat hilly country of Cassini, good supplies of permanent water are provided by this river, but as it extends through the more level areas of Menzies, large and deep waterholes of a permanent nature conserve supplies of water sufficient for irrigation on a minor scale right through to its mouth at Nepean Bay. The telegraph line connecting Kingscote and Cape Borda practically defines the main watershed, and from this, numerous useful rivers commence to collect supplies, some flowing on the longer journey to the south coast and others to the north.

Of these, the most important are Rocky River, Sou'-West River, Stun'-sail Boom River, Harriet River, and Eleanor River in the south, whereas along the northern coast Middle River and Western River provide the main outlets into the sea.



The Harriet River, South Coast.

The American River—so well known as a holiday resort and a rendezvous for anglers —is actualy not a river but a prolongated bay which almost cuts the hundred of Dudley off from the main portion of the Island. This, of course, is sea water, and does not at any point provide water suitable for domestic or livestock purposes.

Mr S Sheridan's Western River property on North Coast.

Although the rainfall received in the hundreds of MacGillivray and Haines is no lower than most of the Island, these areas have comparatively few watercourses of any note.

The following table shows the incidence of rain, from records taken over various periods at the three main recording stations, namely, Penneshaw, Kingscote, and Cape Borda. There is an average annual fall of slightly over 19in. at the two former stations, and approximately 25in. at the most western point—Cape Borda. Although there are no records available for the intervening country, there is no doubt that from east to west the rainfall evenly increases, being slightly better along the hilly northern coast than over the lower-lying southern country.

Average Monthly and Annual Rainfall of the Three Main Recording Stations on Kangaroo Island.

	Penneshaw, 23 Years. Ins.	Kingscote, 59 Years. Ins.	Cape Borda. 67 Years. Ins.
January .	·41	·44	·58
February	·76	·59	·63
March ...	·75	·81	·90
April	1·34	1·42	1 85
May	2·07	2·50	3·18
June	2·75	3·00	4·60
July	2·95	3·02	4·20
August ..	2·61	2·52	3·45
September	2·21	1·87	2 17
October ..	1·49	1·42	1·56
November	1·04	·92	·98
December.	·80	·73	·77
Mean Annual Rainfall	19·18	19·27	24·87

TEMPERATURE TABLE.

Comparison of Mean Monthly Temperatures recorded at Kingscote, Cape Borda and Adelaide.

	Adelaide, 74 Years. Degrees.	Kingscote, 17 Years. Degrees.	Cape Borda. 43 Years. Degrees.
January .	73·8	65·2	65·1
February	74·1	66·3	66·4
March ...	69 8	63·1	63·8
April	64·0	59·8	60·6
May	57·8	56·7	57 1
June	53·5	53·7	54·0
July	51·9	52·3	52·5
August ..	54·0	52·5	52·7
September	57·1	53·7	54·6
October ..	60·2	56·6	57·5
November	67·0	60·0	60·7
December.	71·1	62·9	63 8
Yearly Mean ..	63·0	58·6	59 0

The above records present evidence of good winter rainfall and very satisfactory distribution well into spring. Coupled with the latter, the spring and summer temperatures when compared with Adelaide, are low; an important factor when the growing of crops or pastures is to be considered.

A typical scrub track.

During May, June, and July, the average temperature readings are almost identical with those of Adelaide, but from August onwards the difference gradually increases until January, when the margin is 8.6 degrees. February shows a comparative shortening in the differences, which gradually dwindles until May, when the temperatures again coincide. These lower temperatures during spring and summer represent a decided advantage, and indicate less evaporation during those months, possibly increasing the rainfall value to several inches above that of Adelaide.

Statistical records for the 1935-36 season give the population of the Island as 1,189 persons, and the occupied land as being held by 222 landholders. The two main towns, which are also shipping ports, namely, Kingscote and Penneshaw, have been the starting points for development, and the former will be the base from which any further work of that nature will extend. At present the hundreds of Dudley, Menzies, Cassini, MacGillivray, and Haines are the most important so far as population and production are concerned.

The individual efforts of some farmers provide concrete evidence that a marked improvement in methods of production will take place in the future, provided their practices are accepted. These hundreds have large areas of useful land still in its virgin state, and because of their close proximity to the shipping ports, should be the first to attract attention. Experience in recent years has done much to solve the problem of handling these lands economically, and, as time goes on, development of a permanent nature will extend further west where there are undoubtedly large areas, some of which have not been surveyed, suitable for development from a pasture point of view. The darker, sandy soils present no difficulties and will definitely carry Subterranean Clover and other

Road between Emu and Smith's Bay, showing larger type of scrub

Typical tableland scrub country.

selected legumes as a soil builder, but the shotty ironstone type is not so well understood, although recent results make one optimistic enough to predict that even they will, at no distant date, be improved sufficiently by pastures to grow successfully many other cultivated crops.

Clearing Operations.

Carrying stunted stringy-bark, mallee, yacca, casuarina, and numerous types of bush—most of which can be rolled—the initial operations of clearing do not present any great difficulties, but the growth of numerous bushes and the tenacity of shoots in following years add to the costs in bringing the land into production. It has been the accepted opinion that provision should be made for two or three running fires to deal with this trouble, and that method is certainly effective, whether correct or not. Experience on the mainland has shown that a succession of fires over a number of years upsets the mechanical condition of soils, and it appears certain that in soils definitely low in nitrogen content, every effort should be made to reduce the number of fires to a minimum and prevent the loss of organic matter. To attempt this seems quite logical, but whether it can be carried out economically in practice, remains to be proved. For many years the methods of converting virgin country into sown pastures have not made any marked progress in this State, and it appears that practices generally have been rather slipshod, and insufficient soil preparation has been the cause of many failures. It is the writer's considered opinion that where finance will permit, the treating of virgin land as fallow (and good fallow at that) so that a large percentage of shoots and bush will be eradicated without the use of so much fire, has much to recommend it, and if this suggestion is put into operation, better pasture results will be obtained.

Scrub rolling, Hundred of Cassini.

Early sowing is an important factor in establishing pastures on virgin country, and by fallowing, this very desirable end can be accomplished, whereas, should the burn be delayed or clearing hindered, seeding is often held up when adopting the generally accepted practice. Provided annual plants are used in pastures, a light disc ploughing for a year or so can be given to cope with recurring shoots and bushes, without materially upsetting the prospects of a good pasture, provided the work is completed before the germinating autumn rains.

Grasses and Clovers.

In a report on Kangaroo Island in 1928, the writer drew attention to the possibilities of King Island melilot, Clustered clover, Burr medic, Wimmera rye grass, and Subterranean clover as the most likely pasture plants to be helpful in developing much of the land of the Island, and to-day I am more convinced than ever that these clovers and grasses, with liberal applications of superphosphate, will be the important plants to use, while it is still necessary to give occasional light disc ploughings to complete the clearing process.

With clearing well in hand and soil fertility improved, pasture plants of a perennial type such as *Phalaris tuberosa* and perennial rye grass will improve the botanical analysis of pastures, increase the carrying capacity, and extend the period over which livestock can obtain a picking of green in the pastures.

Fertilisers.

That applications of sulphate of ammonia in addition to superphosphates have shown decided improvement over superphosphate alone in promoting growth, particularly on the virgin, shotty ironstone soils, has been demonstrated repeatedly, but whether the practice can be accepted as being economic or not, has yet to be proved, and is a problem which can only be solved by a series of systematic experiments. It is admitted that numerous tests have been made to ascertain the most suitable fertiliser treatments and seed mixtures, but actual costs of producing a permanent pasture free from bushes and shoots in the most economic manner have not been undertaken. Such data is important, and very necessary where development on a large scale is likely to eventuate. Soils with a low nitrogen content such as are indicated by the response when nitrogenous fertilisers are applied, can possibly be improved permanently at the least cost when the maximum amount of organic matter is conserved, as is done by bare fallowing, rather than by encouraging crop growth by the application of nitrogenous fertilisers to carry a succession of fires.

Field Day Inspection of Wimmera Rye Grass on newly cleared land.

A flock at Hawk's Nest Station.

However, it is to be hoped that those persons who take up virgin country on Kangaroo Island to develop it will give these matters full consideration and avoid difficulties which might result in failure and adverse criticism of the future of the Island because of the methods applied.

Although the writer is definitely of the opinion that large areas of the Island present opportunities for economic development, he feels compelled to sound a note of warning, hoping that those interested will not be carried away by perhaps one year's results, and that to develop this type of country ready capital is necessary in order to carry the settler over a period of at least three years before returns of any consequence can be expected.

Much of the country to which attention has been directed can be converted into pastures capable of carrying two sheep per acre at an approximate cost of £5 spread over a period of 5 years. This presents a very sound proposition for any one in a position to finance the undertaking, but whether the preliminary operations cost more or less, it is important to proceed with caution and determine the soundest methods to apply.

Eleanor River, South Coast.

Although information is scarce concerning the possibilities of obtaining underground water, surface supplies from creeks and dams dismiss any danger so far as water conservation is concerned.

Coast Disease.

The problem of dealing with the so-called "Coast Disease" in sheep, has been raised repeatedly by persons seeking information concerning Kangaroo Island. Definite progress has been made in correcting this trouble, but as the disease is confined to areas where the soil contains a high lime content—in the vicinity of the south coast, the hundred of Dudley and portions of the coastal lands extending from Point Marsden to the American River—new settlers can avoid such land and find extensive areas in the "Coast free" lands for selection.

No rabbits or foxes are on the Island—a very distinct advantage to any district that will be developed for pastures and sheep, but in any isolated settlements away from the main farming districts, there are wallabys and kangaroos to contend with. These vermin, however, will no doubt be kept under control, as new areas are brought into cultivation.

Production.

The following tables show the production of the Island and will give some indication of its agricultural possibilities:—

Table Showing Returns from the Main Cultivated Crop of the 1925-26 Season Compared with those of 1935-36.

	1925-26 Season.		1935-36 Season.	
	Acres.	Total Yield.	Acres.	Total Yield.
		Bush.		Bush.
Wheat for grain	423	4,289	488	7,121
Barley for grain	5,436	103,052	4,524	86,850
Oats for grain	962	8,877	566	6,068
Total crops for grain	6,821	116,218	5,578	100,039
		Tons.		Tons.
Wheat for hay	186	238	191	305
Barley for hay	50	76	50	49
Oats for hay..	1,824	1,979	1,358	1,973
	2,060	2,293	1,599	2,327
Total area of cereals	8,881	—	7,177	—

As indicated by the preceding table, the production of cereals has been at a standstill, showing a reduction in the area sown for both barley and oats for hay.

Low prices offering for cereals over the latter part of that period is possibly to some degree the explanation, but it cannot be accepted as the reason for a reduction in the area sown to oats—both for grain and hay.

As a matter of fact, there is a definite tendency for farmers to concentrate on pasture development both on the older cleared land and virgin country.

The good prices that have been offering for meat and wool have undoubtedly directed attention to their production, and the progress that has been made in these avenues of primary production are shown in the following table:—

	1925-26.	1935-36.
Production of wool	423,253 lbs.	556,843 lbs.
Total area under sown pastures ...	994 acres	8,392 acres
New land cleared for year	1,375 acres	2,598 acres
Superphosphate and other fertilisers used	477 tons	1,434 tons
Yacca gum collected	1,550 tons	1,956 tons
Eucalyptus oil	7,753 galls.	9,153 galls.

An increase of 22,373 sheep improving the wool production by 133,590lbs. in the 1935-36 season certainly shows an advance during the decade 1925-26 to 1935-36.

The 8,392 acres under sown pastures in the 1935-36 season compared with 994 acres 10 years earlier indicates where the additional sheep have been carried.

More important, perhaps, is the fact that 1,434 tons of fertilisers were applied in 1935-36 compared with only 477 tons in 1925-26. The area of new land cleared in 1935-36 was almost double that treated 10 years previously; still another phase of progress helping to improve the prospects for future development.

A census of the livestock taken in the 1925-26 agricultural year and again 10 years later shows the marked increase in grazing animals, namely, sheep and cattle, which was only to be expected after the evidence presented in previous tables.

LIVESTOCK STATISTICS.

A Comparison of the Livestock Population in 1925-26 *with that of* 1935-36.

	1925-26.	1935-36.
	Head.	Head.
Sheep	55,548	77,921
Cattle	807	1,122
Horses	1,156	853
Pigs	275	189
Fowls	7,441	8,342
Ducks	190	196
Geese	14	35
Turkeys	631	1,288

Yacca Gum and Eucalyptus Oil.

The collection of yacca gum has provided a considerable amount of work, but each season those interested in the industry are forced further away from the shipping port in order to obtain supplies.

The distillation of eucalyptus oil still continues and the quantity shipped shows an increase, and while it cannot be expected to expand to any marked degree, nevertheless, it has been a very useful source of revenue and should continue to be so.

For an Island of considerable area, enjoying good rainfall, mild temperatures and reasonable access to markets, the total produce shipped each year does not at first impress one as encouraging after a hundred years of occupation. However, the realisation of the importance of certain pasture plants and the necessity for applying adequate applications of fertilisers have presented the possibilities of development in a more favourable light.

To-day, the importance of pastures is appreciated, and more is understood concerning their establishment on similar soils to those found on the Island, making the future much more hopeful than could be expected had producers been left to develop the country with cereal growing and livestock on natural pastures.

Observations made during recent years have shown the importance of soil inoculation if leguminous plants are to make rapid headway. Whether by the use of seed containing dust from red legume pastures, seed inoculation by cultures or by spreading surface soil from old pastures, some method of providing suitable bacteria in virgin soils appears very necessary to promote vigorous growth during the early stages of establishment.

A number of people from the mainland have recently occupied holdings on the Island, and local farmers are extending operations in developing new land principally for pasture purposes, and to all it is urged that they avoid slip-shod methods and accept the advice that one acre of well established vigorous pasture is worth many containing poorly nourished plants, and that on their success or failure depends the future of Kangaroo Island.

Pasture Section of Dairy Farm Competitions.

[Judged by J. D. McAuliffe, Field Officer, Department of Agriculture.]

ADELAIDE HILLS DISTRICT.

In this section of the Dairy Farm Competitions the conditions applying and the points awarded were as follows:—

	Points.
Condition, &c.	125
Management	75
Total	200

Any dairyman milking at least 7 cows was entitled to enter, and certificates and first and second prizes of £3 3s. and £2 2s. respectively were awarded.

The placing of the entries in this section was in the order shown hereunder:—

Competitor.	Density and Evenness of Sward. (60)	Botanical Composition. (40)	Absence of Undesirable Weeds. (25)	Management. (75)	Total. (200)
Parr, E. A., Meadows	57	37	24	67	185
Feters, H. B., Mount Compass	56	32	21	63	172
Walsh, H., Mount Barker	55	30	20	56	161
Buckley, S. R., Charleston	50	27	20	61	158
Woodroffe, F. E., Delamere	48	30	20	50	148
Dunne, J. P., Mount Barker	50	24	20	46	140

Commenting on the Competitions Mr. McAuliffe said:—

Some very attractive pastures were seen. The importance of top-dressing with heavy, annual dressings of superphosphate was fully realised by all competitors and its use unstinted. This, in the main, was responsible for the density of the pasture swards, which left little to be desired.

The pastures generally were free from undesirable weeds; sorrell, thistles, and capeweed were noted, but were not in sufficient quantity to have any great effect on the pastures.

Subdivision of pastures could be given more attention with advantage. While the areas are all subdivided, and in most cases a system of rotational grazing being practised, greater productivity and more effective management could be obtained by utilising still smaller paddocks. Rotational grazing could then be more easily and effectively carried out, and harrowing immediately after grazing would combat the unevenness of growth which exists when harrowing is not practised.

By the use of heavy dressings of superphosphate and careful management, the pastures on the property of the winner, Mr. E. A. Farr, have reached a very high standard. Mixtures of perennial rye grass and subterranean clover are providing dense swards of well-grown pastures. Of note, also, was the freedom from weeds and annual grass growth, and also the evenness of growth of the pastures. Smaller paddocks could, with advantage, be utilised to effect more easily the management of the property.

Championship Wheat Crop Competition

Won by Mr. H. C. M. Pilgrim, Wolseley.

In his report on the Championship Wheat Crop Competition for the 1936-37 Season, Mr. R. C. Scott (Chief Agricultural Adviser), who judged the entries, states that the wheat crop competitions supervised by the Department of Agriculture have been conducted in South Australia during the past 12 years.

For the first six seasons financial assistance was given by the Government, but unfortunately, in 1931 and 1932, it was found necessary to discontinue this subsidy. However, in the following year a generous donation by the South Australian Farmers' Co-operative Union Limited materially assisted in the success of these competitions, whilst for the past three seasons the Government subsidy has been renewed. Last year and again this season additional assistance has been forthcoming from the Millers' Produce Company of South Australia Limited, who kindly made a liberal donation to each district conducting a Crop Competition under the control of the Department of Agriculture. However, in making this donation, it was stipulated that certain varieties of low milling quality should not be eligible for the prize.

The help thus given has been a very big factor in maintaining interest in the Crop Competitions during the period of depression and low price of wheat.

The main features of the past harvest were the amount of weed growth present in the crops, the absence of disease, the good setting of the ears, and the quality of the grain secured.

The weed growth was largely brought about by the seasonal conditions, although naturally the cleanliness of the fallow preceding the wheat crop had considerable influence. However, generally speaking, the abnormally dry spring weather checked the growth of crops, but allowed the hardier weeds to make headway, with the result that despite favourable finishing conditions they held their own in competition with the wheat plants. This applied particularly to wild oats and saffron thistles, several heavy yielding crops being badly infested with these two weeds. Disease was not a serious factor in the past season. There was a little rust, but it appeared too late to cause damage to the grain. Particularly in Ranee wheat loose smut was to be found, whilst there was a trace of takeall in some crops. However, it is pleasing to be able to state that no bunt was seen in the championship crops.

The rains of November and December, coupled with cool finishing conditions, permitted good setting of grain in the ears and full development of the individual grains themselves. Many attractive and heavy samples were gathered, with the result that most farmers harvested a little more grain than the appearance of the crop led them to expect. On the other hand, the damp weather delayed harvesting operations and resulted in the bleaching of the grain of the later harvested crops.

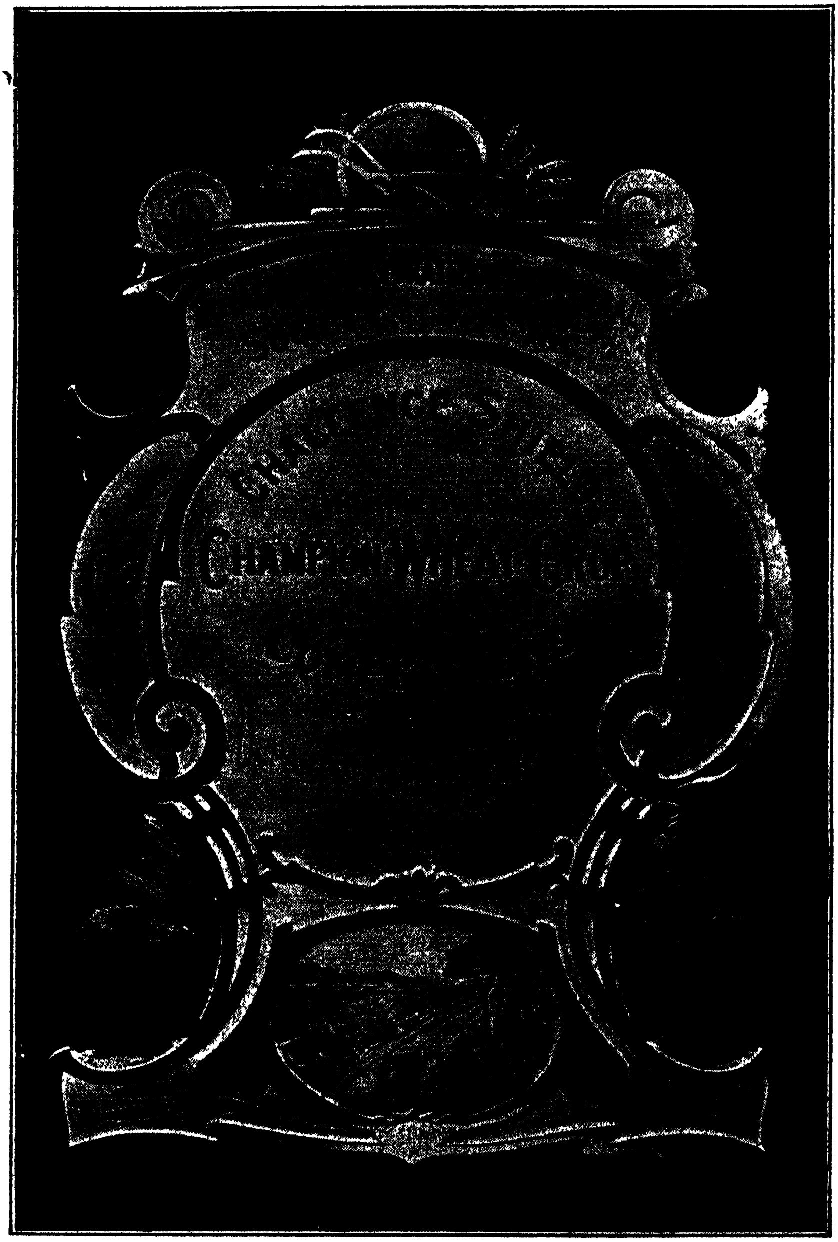
Wheat Crop Competitions were conducted in 18 districts, and a total of 341 crops were entered. The judges appointed by the Department of Agriculture examined all crops, made the awards, and issued reports on the Competitions. The first prize from each District Competition became eligible to compete in the Championship, except if, in the opinion of the judge, it was not sufficiently good to be worthy of inspection. In five of the districts the judges decided that the winning crop was not good enough to leave in the Championship, and therefore 13 crops took part in the competition.

TABLE SHOWING PROGRESS OF WHEAT CROP COMPETITION.

Year.	Districts Conducting Competitions.	Number of Crops Exhibited.
1924	12	290
1925	13	248
1926	17	444
1927	19	525
1928	22	634
1929	21	520
1930	19	473
1931	16	352
1932	20	385
1933	19	351
1934	18	328
1935	19	407
1936	18	341

In 1927 the Royal Agricultural and Horticultural Society offered as a prize a Silver Challenge Shield to the value of 50 guineas and annually a small replica of the shield valued at 5 guineas. In accepting this very generous offer the Government agreed to the conditions laid down by the Society, namely:—

1. The prizes go to the person exhibiting the best crop in the Competition supervised



Challenge Shield, won for the second time by Mr. H. C. M. Pilgrim, Wolseley.

by the Department of Agriculture, the Silver Challenge Shield to be held for a period of 12 months immediately succeeding the award and the silver replica to become the absolute property of the winner.

2. The Challenge Shield with the name of each year's winner engraved thereon to be exhibited in the Town Hall or Institute nearest the farm on which the winning crop was grown.

3. The crop awarded first prize in each supervised District Competition to be taken as an entry for the Championship Competition, except in any case in which it is thought by the judge of the District Competition that the winning crop is not of sufficient merit to warrant inspection for the Championship trophy.

4. All entries for the Championship to be inspected by one judge. Such inspection to be undertaken in each district soon after the district judge has made his awards, but not before the crop has ripened.

5. Each competitor for the Championship to be required to stage one bag of grain and one sheaf (about 1ft. in diameter) of grain in the straw at the Royal Spring Show following the competition.

WINNERS OF THE CHAMPIONSHIP WHEAT CROP.

1927	F. V. Trenorden	Bordertown (Federation wheat)
1928	F. Coleman . . .	Saddleworth (Leak's Rust Proof and Fondling wheat)
1929	F. V. Trenorden	Bordertown (Bena wheat)
1930	H. C. M. Pilgrim	Wolseley (Gallipoli wheat)
1931	A. M. Dawkins .	Gawler River (Ford wheat)
1932	J. P. Carrigg . .	Hamley Bridge (Sword wheat)
1933	H. Michael . . .	Hilltown (Dan wheat)
1934	P. McD. Smyth	Salter's Springs (Sword wheat)
1935	W. H. Watkins	Yeelanna (Sword wheat)
1936	H. C. M. Pilgrim	Wolseley (Dundee and Ghurka wheat)

The Entries.

The crops within the respective districts were all really good. Naturally, when the whole of the State is included in a competition of this nature there is considerable difference between the individual entries, but within each division the crops were uniformly good, making the work of the district judges very difficult, but at the same time leading to improved returns from the district as a whole. In two cases the championship entry included two varieties, with the result that in all 15 plots were inspected. Sword was the most popular wheat, six fields being of this variety, two consisted of Dundee, two of Ranee, and one each of Daphne, Ford, Ghurka, Late Gluyas, and Waratah.

Without exception the grain was extremely well filled and of high bushel weight. In one case the damp weather after maturity had tended to bleach the grain, but not to an appreciable extent. Within recent years very marked improvement in the matter of barley in the competition crops has been effected. In only three plots was any to be found, and in these only a very occasional plant was seen. Whilst this is largely the result of increased care with the grain to be planted, it is also associated with the grading of the seed wheat—a regular practice on many farms nowadays. The grader will remove most of the barley and in all the Championship crops graded seed was sown. The hail experienced in certain districts early in December knocked a little grain from the ears, but despite the plumpness very little was shed.

The Awards.

The Championship crop is judged on the same scale of points as the District Competitions, but when reporting on the entries it has become customary to only place the first, second, and third crops in their respective positions.

The remainder are not shown in order of merit, but are discussed in alphabetical order, according to the name of the exhibitor.

The same practice is adopted this year. There was very little difference between the points awarded to each of the placed crops. That exhibited by Mr. Pilgrim gained first position because of a uniformly high standard throughout. Mr. Watkins's entry would have reversed the position had the Late Gluyas wheat been more true to type, whilst the 50 acres of Sword submitted by Mr. Simon did not have a sufficiently high apparent yield to allow him to carry the day.

The awards and a brief description of the crops included in the Championship Competition are set out below.

Championship Wheat Crop (Dundee and Ghurka).

H. C. M. PILGRIM, Wolseley.

The Championship Wheat Crop Competition of the State for season 1936-37 was won by Mr. H. C. M. Pilgrim, with 40 acres of Dundee wheat and 10 acres of Ghurka wheat. Mr. Pilgrim's farm lies about six miles in a southerly direction from Wolseley and a little to the south-east of the Custon railway siding.

Mr. Pilgrim's crop was successful in winning the Tatiara Wheat Crop Competition against very strong opposition and was well worthy of the highest award possible in this State. The Ghurka wheat entered in order to make up the 50 acres required was not quite up to the standard of the Dundee, but both were heavy yielding plots.

The Championship Crop.

The grain was plump and weighty, and despite the relatively rough and wet finishing conditions had not shaken out from the ears.

The land on which the crop was grown carried wheat in 1930, followed by oats in the next season, and was then left out as pasture for a year. The following season it was fallowed in preparation for a wheat crop in 1934, and again fallowed in 1935 for the Championship crop.

Ploughing was done by means of a mouldboard plough early in April, and the land received frequent tillage throughout the season. It was cultivated early in June, mid-August, early November, and again in the second week of June before seeding. As the crop was combined in on the 18th and 19th June, the soil received further tillage with this operation.

Graded seed pickled with copper carbonate was planted at the rate of 60lbs. to the acre in the case of Dundee, and 54lbs. in the case of Ghurka, whilst the whole area received a dressing of 75lbs. of 45 grade superphosphate to the acre.

Despite the very thorough tillage, there was a sprinkling of wild oats throughout, and this was the weakest feature of an otherwise extremely good crop.

A little red rust was in evidence, but had made its appearance too late in the season to have any appreciable effect upon the yield. No other disease was to be found in the plot of Dundee, but some loose smut occurred in the Ghurka.

Whilst both varieties were fairly true to type, each contained a few white chaffed plants and an odd brown chaffed bearded wheat. The crop had been carefully planted and very little land missed at seeding time. The nature of the country, with some rather wide crabholes, tended to make the crop irregular, but except for the influence on yield this is not taken into account when judging, as "evenness" applies to careful workmanship during seeding operations. The winning entry was therefore a most attractive crop, carrying a few more wild oats and white chaffed wheat as an impurity than was altogether desirable, but nevertheless, well worthy of Championship honours, and showed evidence of very efficient farming methods on the part of Mr. Pilgrim.

W. H. WATKINS, Yeelanna (Late Gluyas).

There was one very outstanding feature in this exceptionally fine crop exhibited by Mr. Watkins, and that was its freedom from weeds. In a year in which most crops were more or less infested with weeds this crop was practically clean, only an isolated wild oat and a very occasional thistle being found.

This indicates very careful farming practices and the land on which the crop was planted carried wheat on fallow in 1932, was then left out as pasture for two years, and in 1935 fallowed for the present crop. Ploughing took place in July and the land was harrowed in August, cultivated in September, and again harrowed in October. In January the field was cultipacked, skim-ploughed toward the end of April, and given further light tillage by means of the harrows during May. At the end of June 70lbs. of graded and dry pickled Late Gluyas seed wheat was combined in together with 140lbs. of 45 grade superphosphate per acre, and the field immediately cultipacked. This very thorough preparation is reflected in the wonderfully clean crop which resulted.

Successful Crop in the Flinders Competition—Mr W. H. Watkins

Some patches had lodged rather badly, whilst in a few places the ears had been damaged by frost. The weakest part of this crop was the purity of the seed sown. There was quite a fair sprinkling of white chaffed wheat, both bearded and beardless, and the points lost in this section were sufficient to force the crop into second position.

This heavy yielding, attractive Competition crop gained first place in the Flinders Competition and reflected great credit on the exhibitor.

W. P. R. SIMON, Halbury (Sword).

Whilst not such a heavy yielding crop as some of the other entries, the 50 acres of Sword submitted by Mr. Simon won the Mid-Northern District Competition and gained third place in the Championship. It was planted on fallow land, which had been preceded by three years of pasture, whilst prior to this the field had carried a crop of wheat.

Ploughing was done with a mouldboard plough in June, and the soil broken down with harrows in July, followed by a cultivation in August and November. After a harrowing in February, two cultivations were given in April, and 75lbs. of graded dry pickled wheat, together with 140lbs. of 45 grade superphosphate were combined in in mid-May. The crop was a little irregular, being better on the heavier type soil and thinning out on the lighter land. Weeds were not plentiful, charlock being most numerous and more in evidence on the lighter land, where the wheat crop was not so dense. There was a little rust throughout the crop, but this was not a serious factor, and no other diseases were found. As old type Sword seed had been used, the crop contained a sprinkling of other brown headed and bearded varieties.

Crop entered by Mr. W. P. R. Simon.

The drilling was good and very little land had been missed at seeding time. Mr. Simon is to be congratulated on exhibiting such a good crop, particularly when the rainfall conditions of this district are considered, and the results obtained indicate that very thorough farming practices have been adopted.

Other Entries.

(In alphabetical order.)

H. CANT, Kimba (Waratah).

The crop exhibited by Mr. Cant won the Buxton District Competition, and although hardly heavy enough to win a State Championship, carried particularly well-filled ears, and promised much more grain than might be anticipated by the height and density of the straw.

There was a fair amount of charlock throughout the crop, but it was practically free of disease and true to type. Consequently, apart from yield, this was quite an attractive Competition crop, and showed good farming practice on the part of Mr. Cant.

GEO. CROSS, Belvidere (Sword).

Mr. Cross succeeded in winning the Southern District Competition with a very attractive crop, consisting of 50 acres of Sword wheat. The field was a little irregular, the central portion carrying a heavier yielding crop than the edges. The crop was fairly clean, with a sprinkling of wild oats, charlock, poppy, and dandelion, but was not bad so far as weeds are concerned. A little takeall was found on some of the lighter land, and plants affected with loose smut were scattered throughout the crop, but otherwise it was free of disease. The variety being the old type Sword, there was an admixture of brown eared wheat and later maturing strains. As better seed is now obtainable it would be an advantage if this was secured for future Competition crops.

Every care had been taken at planting time, and practically no land had been missed with the drill.

A. N. & H. FREEBAIRN, Owen (Ford and Sword).

There were two varieties included in the crop which won the Balaklava District Competition, with Ford promising a slightly higher yield than Sword. The land had been cropped on a three-course rotation, namely, bare fallow, wheat, oats, and in preparation for the Competition crop, was ploughed in August, harrowed almost immediately, cultivated in September, harrowed in October, and then given light tillage with the combine in November and early May, before being seeded in mid-May with 70lbs. of graded and dry pickled seed together with 187lbs. of superphosphate to the acre.

The crop was rather weedy, with wild oats, charlock, and dandelion. There was a fair amount of red rust showing on the

Sword, but this disease was not so evident on the Ford wheat. Both varieties were fairly true to type, with only a few brown eared wheats scattered throughout each.

The crop was rather irregular, some patches being very heavy and others shading off to relatively light yields.

Seeding operations had been satisfactorily carried out, with only an odd wide space between the drill widths.

E. H. HAMPEL, Terka (Sword).

The land on which Mr. Hampel grew the crop which won the Far Northern District Crop Competition had been cropped on a bare fallow-wheat rotation, and was ploughed early in August with a mouldboard plough. Subsequent tillage consisted of three harrowings—in September, October, and January; and three cultivations—in October, April, and May, before 61lbs. of graded dry pickled wheat, together with 97lbs. of superphosphate to the acre were combined in at the end of May. Parts of the crop were affected by wild oats, but the ears were well filled and the grain very attractive. The old type Sword had been seeded, with the result that there was a sprinkling of brown chaffed wheat throughout the crop, whilst the purple strawed strain carried loose smut. In addition, there was a little takeall present, but the crop was not seriously attacked by disease. Very careful work had been done at seeding time and planting was wonderfully regular, full points being allotted for this section.

A. M. MAHOOD, Wirrabara (Ranee 4H).

This entry won the Northern District Crop Competition, and the field that carried it had been worked on a bare fallow-wheat rotation. The land was ploughed in July, cultivated and harrowed in August, September, and March, whilst at the end of May 60lbs. of graded dry pickled seed and 187lbs. of superphosphate were combined in to the acre. This was a heavy yielding crop, although some grain had been lost through hail. However, it was somewhat weedy with wild oats, saffron thistles, and poppies, whilst there was also a fair amount of loose smut throughout the crop. A little red rust had made its appearance, but this would have little influence upon the yield. The variety was reasonably true to type, with a sprinkling of white chaffed and bearded wheats throughout the area.

H. POLKINGHORNE, Minlaton (Sword).

The Southern Yorke Peninsula crop Competition was won by Mr. H. Polkinghorne with a crop of Sword, which was planted on land worked on a four-course rotation, namely, bare fallow, wheat, barley, pasture.

After ploughing in August, the land was harrowed, cultivated in October, January, and May, and sown with a combine in the middle of June; 70lbs. of graded seed, which had been pickled with formalin, and 116lbs. of superphosphate were sown to the acre. This was a very nice crop, which, although weaker at the southern end, promised a fairly heavy yield of good quality grain. Wild oats were scattered throughout, and also some charlock, but the crop could not be described as weedy.

There were a few patches affected by takeall and also a sprinkling of plants attacked by loose smut, together with a little red rust, but the latter disease was not doing much harm.

As is the case where the old type Sword seed is utilised, brown chaffed wheat was present throughout the crop, whilst a few plants of barley were also to be found.

The seeding was not as careful as is desirable, and some rather wide spaces had been missed by the drill.

J. H. ROBERTSON, Arthurton (Ranee 4H).

This crop, which won the Northern Yorke Peninsula District Competition, was grown on the farm of Mr. E. W. Ciasohm, Arthurton. A four-course rotation of cropping—fallow, wheat, barley, pasture—had been adopted.

The Ranee 4H was a relatively short-strawed crop, which, although promising a fair yield, was not heavy enough to have a chance in a State Championship. It was a clean crop, with a few wild oats, charlock, melilot, and wireweed. Loose smut was prevalent throughout, with a little rust and takeall. The crop lacked in trueness to type, and brown bearded and white chaffed plants, together with some barley, were present as an admixture.

T. SHANAHAN, Freeling (Daphne).

The Central District Crop Competition was won by Mr. Shanahan, with 50 acres of Daphne wheat.

This crop had shed a little more grain than the others judged in the Championship, but nevertheless showed promise of a fair yield. The grain had filled well and the ears had set satisfactorily.

Wild oats were prevalent throughout the crop, together with some charlock, poppy, nancy, and wireweed.

Not much disease was to be found, there being scattered plants attacked by loose smut and a little takeall. However, the purity was not as good as it might have been, and there was a percentage of barley and bearded wheat plants in this entry. The crop had been reasonably well seeded, but some rather wide strips had been missed.

A. SPRIGGS, Yadnarie (Sword).

Mr. Spriggs is to be congratulated on winning the Jervois District Competition with this very fine crop, considering the very low rainfall which was experienced in that area during the past year. Naturally, the yield was not sufficiently high to give it a chance in the Championship, but at the same time it was a very creditable entry when all circumstances are taken into account. The crop was very free of weeds, only a little charlock being present, whilst, except for odd patches of takeall and a little spotted rust, it was not damaged by disease.

The Sword was of the old type, but was fairly free of the brown-headed strangers commonly associated with the earlier strains of this variety. The whole field had been carefully planted and the land evenly seeded.

E. V. H. WILSDON, Andrews (Dundee).

Although last when the owners' names are considered in alphabetical order, this crop, which won the Midlands District Wheat Crop Competition, was very little behind the placed crops when the total points are taken into account. It was one of the heaviest yielding crops entered in the Championship, despite the fact that it was somewhat irregular, with portion on the eastern side promising a lower return than the remainder.

The heavy yielding crop exhibited by Mr. E V. H. Wilsdon.

Unfortunately, saffron thistles were numerous, and with the presence of a few other plants, the crop lost points for "Freedom from Weeds."

Some flag smut and loose smut were to be found, but the entry was not bad in this regard.

There was a sprinkling of white chaffed wheat throughout the crop, and a single barley plant was seen. The land had been worked on a bare fallow-wheat rotation for some years, and after being ploughed in July, was harrowed in August, cultivated in October, November, February, and May, and sown with a combine toward the middle of the latter month; 83lbs. of graded dry pickled seed and 145lbs. of superphosphate were seeded per acre.

Mottle-Leaf of Citrus—Preliminary Note on Correction in South Australia with Zinc Sprays

[By A. G. STRICKLAND, M. Agr. Sc., Chief Horticulturist.]

The field work referred to hereunder has been conducted by N. S. Fotheringham, Manager, Experimental Orchard, Berri, and District Horticultural Advisers J. B. Harris, E. Leishman, and C. G. Grasby. H. K. Kemp, B.Ag.Sc., Research Officer, has been responsible for the photographic work.

Citrus mottle-leaf or foliocellosis has been noted in various citrus-growing districts throughout South Australia, the disorder occurring under varying soil, climatic, and cultural conditions. Specific occurrences of mottle-leaf have been under observation in such dissimilar districts as Berri, Waikerie, Mypolonga, and Beetaloo Valley, and although a variation in intensity of the trouble has been noted, the general symptoms have been similar in each area.

As has been the experience in the United States, there appears to be in South Australia a number of indirect causal or contributory factors associated with the mottling; very heavy infestation of tree roots with the Citrus Nematode (*Tylenchulus semipenetrans*) (see Figures 1 and 2) was found to be associated with cases of mottle leaf occurring at Berri, Waikerie, and Beetaloo Valley, thus confirming the observations of *Thomas, in California. Affected trees at Beetaloo Valley, in addition to being heavily infested with citrus nematode, were located in soil containing injurious salts (notably sodium chloride) at concentrations generally considered inimical to maintenance of thriftiness.

Neither heavy nematode infestation nor excessive soil salinity were obviously associated with the incidence of mottle leaf at Mypolonga.

At Beetaloo Valley, steps were first taken to correct the position in regard to soil salinity, the grower being advised to vary his irrigation practice in such manner as to aim at downward leaching of salt, and to safeguard against further undue saline accumulations in the surface soil.

In other centres where citrus nematode was the chief associated factor, the position initially appeared to be very difficult; owing to the nature of the citrus nematode, no direct measures against this pest could be suggested. There is abundant evidence that on suitable soils, and where good cultural practices are employed, citrus trees may be maintained in good health, despite the presence of citrus nematode on their roots. That is to say, combat of citrus nematode must consist in ensuring that soil and cultural factors are as favourable as possible.

Recent investigations in America have indicated that mottle leaf may often be related to deficiency of zinc, whatever indirect contributory or secondary factors may be operating; or at least, that the mottle leaf condition may, in many cases, be rectified by application of zinc compounds. Various factors frequently associated with mottle leaf—such as citrus nematode infestation, soil salinity, lack of soil humus, &c.—may be partially contributory. The exact relations of these factors still remain to be determined, but as treatment with zinc has been so widely successful in other countries, experiments have been conducted with zinc compounds in several South Australian districts.

First attempts to supply zinc to citrus trees suffering from mottle leaf consisted of direct applications to the soil of zinc sulphate; although this method was usually effective, it was also dangerous and frequently resulted in injury to treated trees.

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* THOMAS, E. E., 1913: "A preliminary report of a nematode observed on citrus roots and its possible relation with the mottled appearance of citrus trees." Calif. A.E.S. Circ. 85, 14 pp. 8.

When citrus trees are sprayed with zinc compounds, the leaves are able to take up appreciable quantities of zinc, and there is little or no danger of tree injury. Experimental work in South Australia has been confined to the application of zinc-containing sprays.

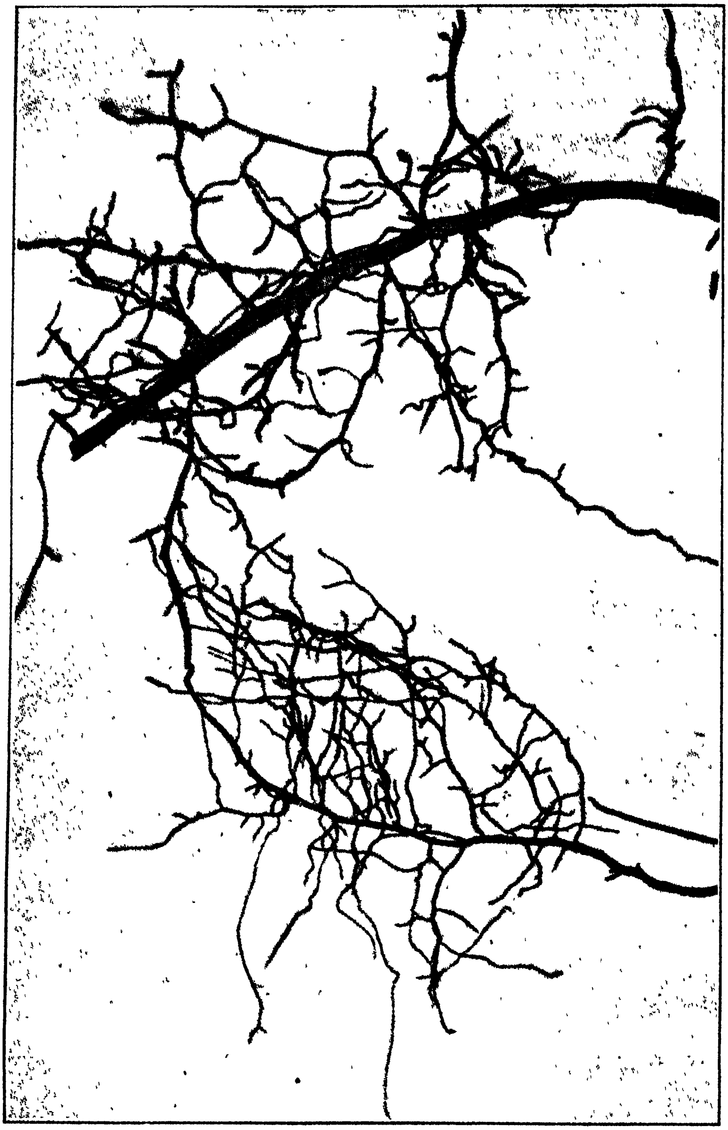

Figure 1.—Citrus roots showing effect of attack by nematodes. (Upper)—Showing the fibrous roots slightly enlarged and irregular and with soil clinging tightly to them as a result of nematode infestation. (Lower)—Showing healthy roots not infested.

(From "Citrus Diseases," Fawcett & Lee.)

Symptoms of Mottle Leaf.

The leaves show irregular yellow chlorotic areas between the main lateral veins, the part surrounding the mid-rib and lateral veins usually remaining green. The result is an irregular mottling, and where trees are but slightly affected, little or no effect on tree health or cropping may be noted.

In severe cases, however, leaves on new growth are frequently small, and there develops considerable dieback of young twigs, the tree becoming stunted, unthrifty, and unproductive.

Typical mottle-leaf is depicted in Figures 1, 2, and 3. In Figure 3, the central leaves of each row are normal, and different types and stages of mottle-leaf symptoms are shown by other leaves in the photograph. Figure 4 illustrates the typical disappearance of green colour, except in the region of the main veins of the leaf. This disappearance of green colour has been shown due to the absence of chlorophyll (a green plant pigment) in the yellowed areas. Figure 5 shows a mottle-leaf affected twig on the left, and a healthy twig from a zinc-sprayed tree on the right.

Experiments in South Australia.

The chief experiments on mottle-leaf control have been carried out at Berri, but check plots have also been sprayed at Waikerie, Mypolonga, and Beetaloo Valley.

Trials with Zinc Sprays at Berri.

The material concerned in these trials consisted of 60 late Valencia orange trees on the property of Mr. B. H. Jungfer. The trees were seven years old, and the cultural treatment which had been applied to them subsequent to planting was such that they were expected to thrive; the soil type on which they were planted was Winkie Sand according to the Council for Scientific and Industrial Research Soil Survey classification, there was no evidence of high water table or soil salinity, and a sound cultural programme had been practised. Nevertheless, each of the 60 trees—disposed in two rows each of 30 trees (see Figure 6)—was showing severe mottle-leaf. Orange trees of mature age immediately adjacent were generally thrifty and productive, although occasional instances of mild mottle-leaf were also noted in these mature trees.

During March, 1936, individual trees were treated in rotation as follows:—

1. Sprayed with zinc sulphate 10lbs., hydrated lime 5lbs., skim milk 3galls. per 100galls. of water.
2. Sprayed with zinc sulphate 5lbs., hydrated lime 2½lbs., skim milk 3galls. per 100galls. of water.
3. Not sprayed.

At this time, root specimens were taken from the trees under test, and examination of these specimens showed that the trees were heavily infested with citrus root nematode (*Tylenchulus semipenetrans*).

Results.

A slight improvement in the appearance of sprayed trees was noted in June, 1936, and this improvement became more marked as the season progressed. In spring, the difference was readily visible, trees sprayed with both levels of zinc showing a more thrifty appearance, and throwing out healthy growth. The improvement was consistent, all sprayed trees exhibiting better health, and all unsprayed trees remaining severely mottled and nonthrifty. The sprayed trees carried heavier bloom, and it was also noted that the restricted blooming of unsprayed trees was irregular and retarded.

A second series of sprays was applied early in October, the half-strength zinc-lime mixture being substituted on this occasion by a spray of zinc oxide—3lbs. per 100galls.

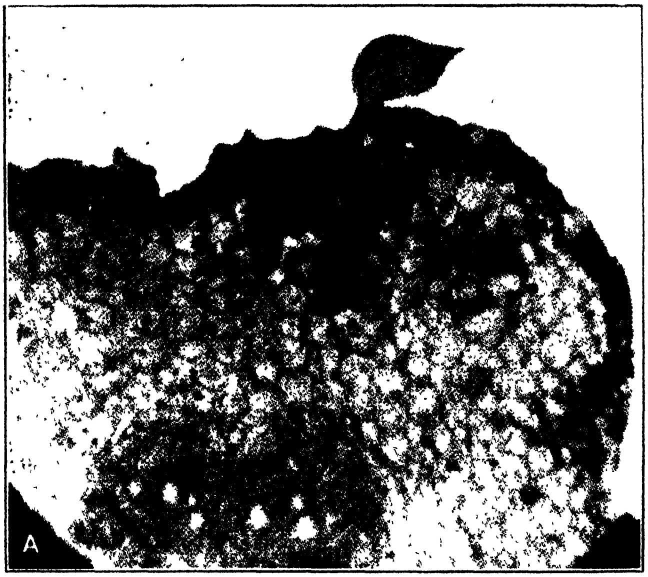

Figure 2—Cross section of a citrus rootlet showing a female nematode with its head imbedded in the tissue (Magnified about 200 times.)

(From "Citrus Diseases," Fawcett & Lee.)

The outstanding response of the trees to zinc sprays is shown in Figures 5, 6, and 7.

In Figure 5, a mottled twig is shown in juxtaposition to a healthy twig taken from a tree sprayed with zinc. Note the residue of zinc oxide (applied in October) on the healthy shoot. These two shoots were taken from unsprayed and sprayed trees in mid-January, 1937.

Figure 6 is a general view of the experimental area, and on the left of the photograph, two vigorous zinc treated trees may be seen; the third tree near the centre of the photograph is a small unthrifty mottled tree which did not receive zinc sprays. Older citrus trees may be seen in the background.

A closer view of a treated and an untreated tree is shown in Figure 7, both photographs being taken in mid-January, 1937; the tree on the left (7A) received zinc sprays in March and October, 1936, whilst the tree on the right (7B) has received no zinc sprays.

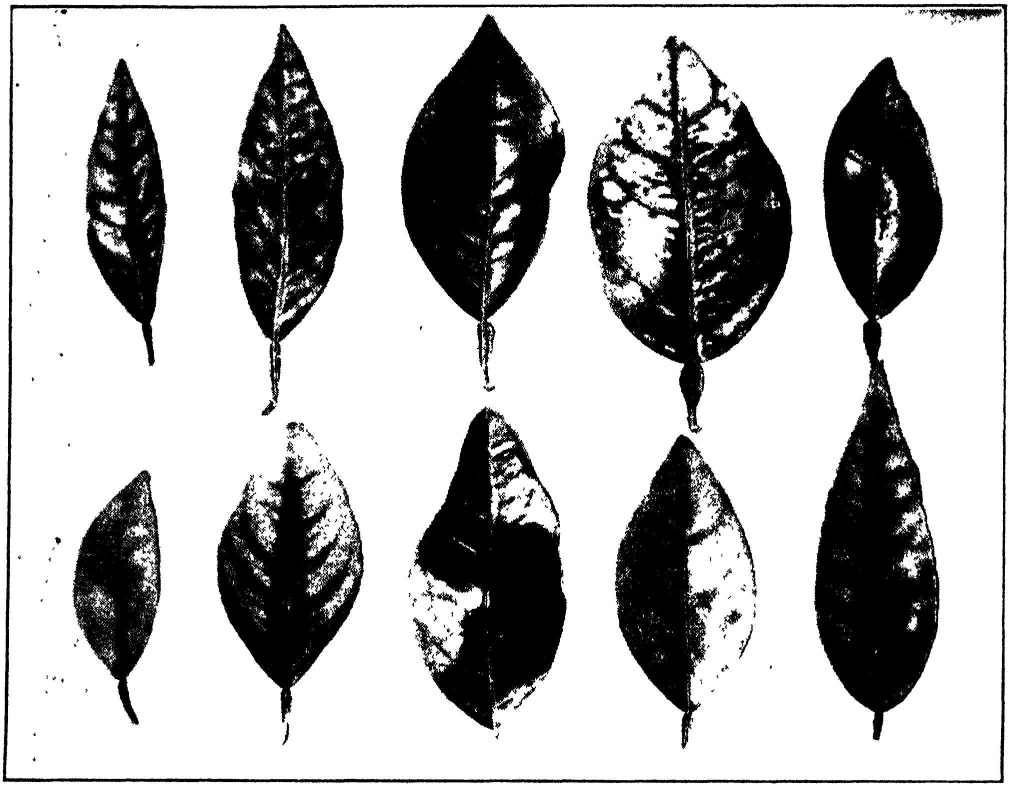

Figure 3.—Showing normal and mottled leaves. The two central leaves are normal, and other specimens exhibit various types and degrees of mottling.

An interesting feature of this trial is the fact that despite heavy nematode infestation, and the extremely unhealthy condition of fibrous roots—apparently sufficient to account largely for the non-thrifty condition of the trees—zinc treatment has resulted in remarkable improvement.

This suggests that zinc sprays may be stimulative, rendering the trees more vigorous, and better able to grow normally in association with the root nematode.

Clark Powell and Mathews have recorded in South Africa, that mottle-leaf affected trees, five months after application of zinc sulphate sprays, showed marked development of new fibrous roots; unsprayed trees did not show this tendency to develop new feeding rootlets.

This apparent effect of zinc treatment in stimulating root development is obviously of importance when trees are infested with root nematode.

Trials in Other Districts.

Since the initiation of zinc spraying trials at Berri, similar trials have been carried out at Waikerie, Mypolonga, and Beetaloo Valley. In each of these centres, spray treatments have been applied more recently than at Berri, and it is yet early to expect responses as marked as those noted at the latter centre. However, in every instance, visible improvement in tree health, and some disappearance of mottle-leaf symptoms have already been observed.

At Waikerie, trees affected with mottle-leaf have been subjected to zinc treatment on two properties, and in each instance improvement has occurred. In the Mypolonga area, Washington navel orange trees and lemon trees have been subjected to experiment on neighbouring properties; sprays of zinc sulphate-lime mixture 10 : 5 : 100, and of zinc oxide—3lbs. per 100galls., were applied in August and again in October to certain sections. Skim milk was used as a spreader and untreated plots were included.

Examination in January, 1937, disclosed improvement in all treated trees, the lemon trees showing a more marked response than the orange trees.

At Beetaloo Valley, an area of orange trees on the property of Mr. J. Halse has been badly affected with mottle-leaf for a considerable period. Investigation in 1935 showed that excessive soil salinity and heavy infestation of the roots with citrus nematode were both associated with the condition of the trees and, in so far as facilities permitted, irrigation technique was amended with a view to correcting the position in regard to soil salinity. Until recently, however, the amendment of irrigation technique of itself had not resulted in appreciable improvement of tree health.

In July, 1936, representative plots on this area were sprayed with zinc sulphate-lime mixture 10 : 5 : 100 and with zinc oxide—3lbs. per 100galls. The plots were examined in December, 1936, by District Adviser J. B. Harris, who states that whereas untreated trees have made no apparent improvement in health, all trees which have received zinc sprays are practically free from mottle-leaf and making healthy growth.

Discussion.

The application of zinc sprays to mottle-leaf affected citrus trees in several districts has led to marked improvement in tree health, and the disappearance of mottle-leaf symptoms. The value of zinc applications under widely varying district conditions has been demonstrated, but the exact manner in which the mineral achieves the response is still somewhat obscure.

Extensive research work in overseas countries is now throwing light on many previously obscure features of mottle-leaf, and micro-chemical analysis and cytological investigations are both important in the study of fundamentals. In the field, however, there is scope for considerable work in regard to the determination of conditions under which zinc sprays may be expected to be of value, the optimum season for zinc spray treatment, the frequency at which zinc sprays should be applied, and the possibilities of combining zinc compounds with other routine sprays or dusts.

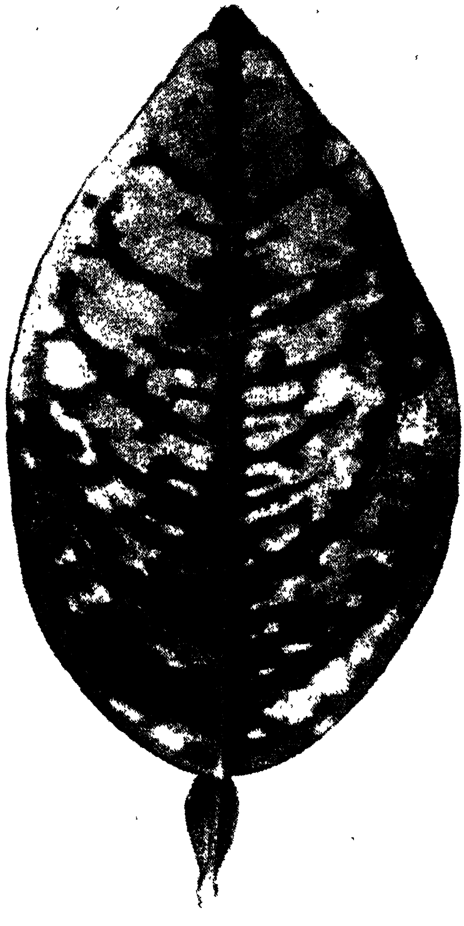

Figure 4.—A mottled leaf. Note characteristic persistence of green chlorophyll in the region of mid-rib and main veins

Nevertheless, the results achieved have been so outstanding that it is considered desirable to bring the known facts before growers in this preliminary report.

Recommendations.

At this juncture, it is obviously impossible to issue a general recommendation, but in view of the success achieved in

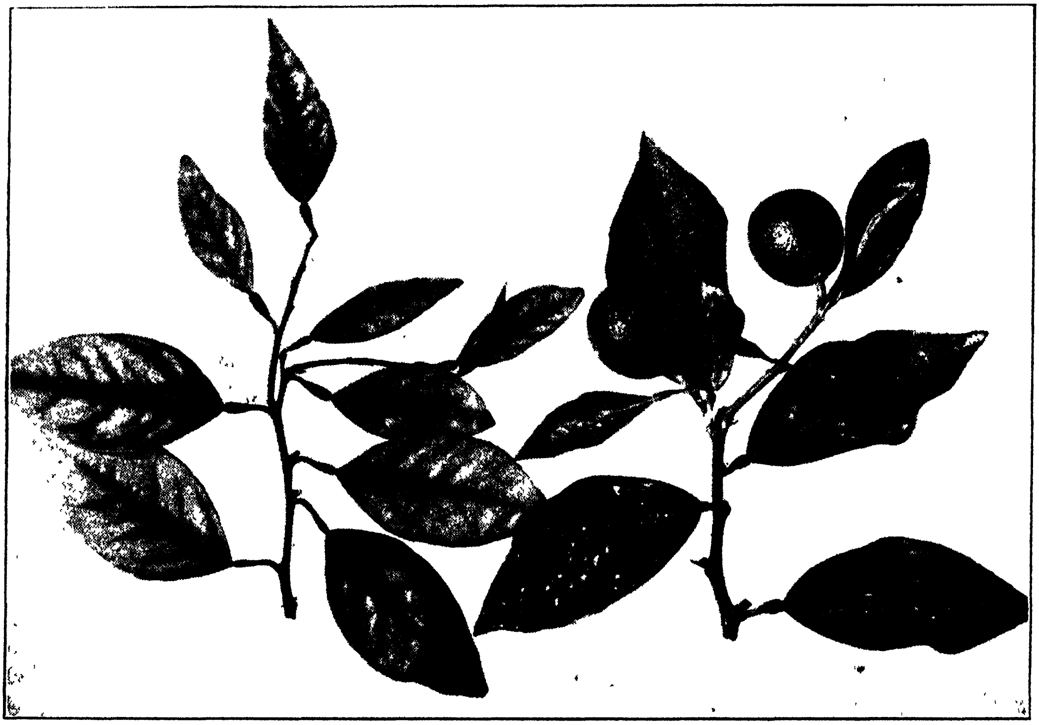

Figure 5.—Mottled twig from untreated tree (left) and normal twig from sprayed tree (right). Severed from trees at B H Jungfer's grove in mid-January, 1937. Note residue of October application of zinc oxide on healthy twig.

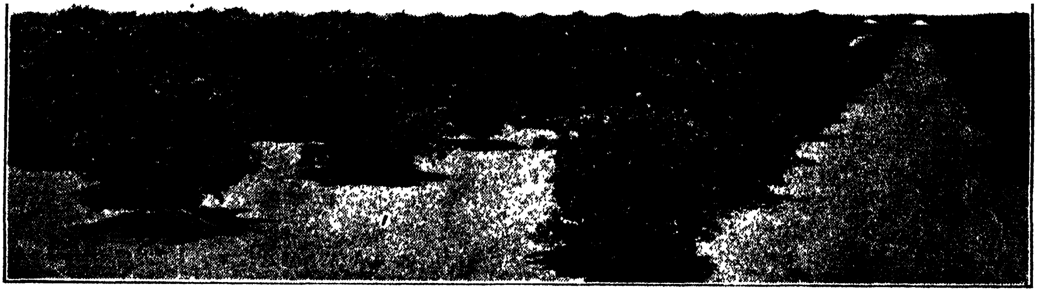

Figure 6—General view of experimental area at Berri. In the foreground may be seen two vigorous sprayed trees in juxtaposition to a non-thrifty untreated tree.

preliminary experiments, it is suggested that growers should conduct on their own behalf, trial sprayings of trees affected with mottle-leaf.

For such trials, a spray composed of 3lbs. of zinc oxide per 100galls. of water is recommended; a spreader such as lime-casein or skim milk (3galls. per 100galls.) may be employed. The cost of spray material is not high, a suitable grade of zinc oxide being available at from 6d. per lb. Although this spray may be applied with reasonable safety at any time of the year, it is undesirable to carry out extensive spraying within a short period of harvest owing to possible difficulty in removing spray residue.

Generally, better responses have been obtained when zinc sprays have been applied just prior to a growth period, and overseas experience has indicated that the beneficial effects of zinc treatment may be expected to persist for a period of approximately two years.

It is not anticipated that zinc treatment will correct unthriftiness where trees are grossly affected by seepage, excessive salt accumulations, poor cultural treatment, or other adverse environmental conditions, but there is definite promise that many cases of typical mottle-leaf may be successfully treated.

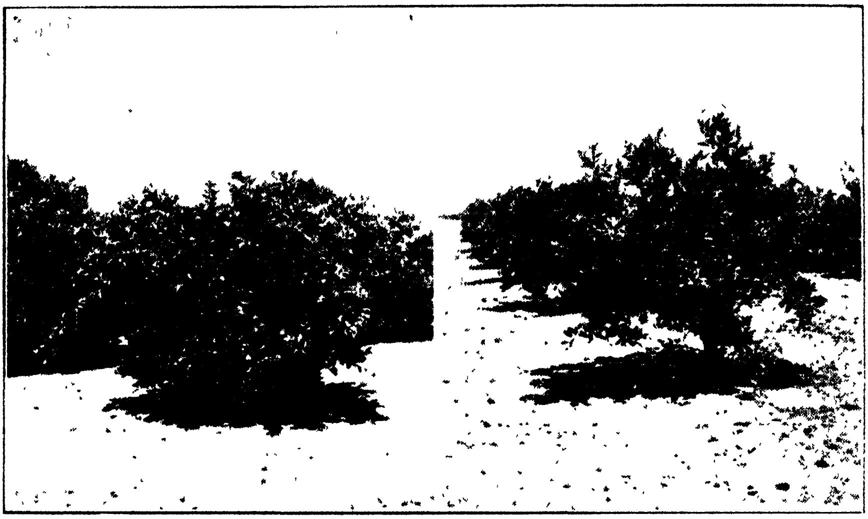

Figure 7.—(Left) Sprayed with zinc in March and October, 1936. Photo. January, 1937
(Right) Unsprayed tree. Photo. January, 1937.

Pink Eye in Sheep.

Asking for information as to the treatment of sheep affected with "Pink-eye," Mr. A. H. Robin, B.V.Sc., of the Stock and Brands Department, has advised a subscriber to the *Journal of Agriculture* that "Pink-eye" is a highly contagious disease, and affected sheep should, if possible, be isolated away from sound sheep being kept preferably in shady surroundings to protect their eyes from the direct rays of the sun. The following lotion should be used for instilling into the eyes:—Zinc sulphate, 1 level teaspoonful; distilled water, 1 pint.

A few drops of this lotion should be put into the eye sac two or three times daily until the condition clears up. Use at blood heat.

Seed Wheat from Crop Competitions, 1936-37

In Wheat Crop Competitions conducted in the undermentioned districts the following competitors exhibited crops which, in the opinion of the judge at the time of inspection, should produce grain suitable for seed purposes:—

ALFRED.

Competitor and Address. Varieties.
A. A. Marsh, Meribah—Sword, Ranee 4H.
Auricht Bros., Taldra—Sword, Ranee 4H.
J. C. Auricht, Taldra—Nabawa.
G. J. Zimmermann, Meribah—Baringa, Nabawa.
A. C. Webb, Paruna—Sword, Baringa.
E. M. Edwards, Paruna—Ranee 4H, Sword.
P. Paull, Alawoona—Ranee 4H.
A. E. Obst, Ingalta—Nabawa.
A. W. Traeger, Loxton—Baringa.
R. E. Thiele, Loxton—Bencubbin.
D. & H. Kretschmer, Paruna—Sword.
G. E. Hyde, Paruna—Nabawa.
N. W. Zimmermann, Meribah—Nabawa

CENTRAL.

E. W. Day, Reeves Plains—Sword.

BALAKLAVA.

A. N. & H. Freebairn, Owen—Ford, Sword.
Sorrell Bros., Barabba—Ford, Sword.
Bowyer Bros., Owen—Sword.
A. G. Roberts, Barabba—Sword.
J. D. Campbell, Barabba—Sword.
G. Uppill, Balaklava—Caird.
Harkness Bros., Owen—Ford and Sword.
D. J. Wilson, Barabba—Sword.
J. A. Campbell, Stockyard Creek—Ford.

FAR NORTHERN.

E. H. Hampel, Terka—Sword.
J. J. Modystach, Wilmington—Sword.
W. G. Gregurke, Wepowie—Dundee, Ranee 4H, Felix, Merridin.
E. H. Schulz, Terka—Sword.
T. F. Orrock, Wepowie—Ranee 4H.

ALBERT.

J. W. G. Mann, Mindarie—Sword, Dundee.
E. A. Kroehn, Nildottie—Bencubbin.
A. W. G. Grant, Sandalwood—Sword.

LEHUNTE.

P. P. Cook, Mount Dampier—Ford, Sword.
S. C. Billinghurst, Minnipa—Ranee 4H, Sultan.
A. J. Shepherd, Wudinna—Ford.

WAY.

L. Martin, Maltee—Quality.
P. S. Morrison, Waranda—Felix.
A. E. Howlett, Goode—Ford.

SOUTHERN.

C. Baensch, Tepko—Sword.
A. R. Paech, Tepko—Sword.
B. A. Zadow, Tepko—Dundee.
C. S. E. Paech, Tepko—Bencubbin.
E. A. Paech, Palmer—Sword.
L. H. Wachtel, Palmer—Sword.
B. R. W. Lindner, Palmer—Dundee.
L. M. Eichler, Mannum—Sword.
N. W. Borman, Millendilla—Pine Head.
S. A. Bretag, Mannum—Sword.

SOUTHERN—*continued.*

Competitor and Address. Varieties.
Rankine Bros., Strathalbyn—Ranee, Baringa.
Geo. Cross, Belvidere—Sword.
H. H. Cross, Woodchester—Ford.
Mrs. L. S. Jaensch, Hartley—Ranee.
A. B. Jaensch, Hartley—Nabawa.
C. A. Whittlesea, Langhorne's Creek—Sword.
C. F. Altmann, Monarto South—Ranee, Sword.
Thomas Bros., Monarto South—Sword.
E. E. Liebelt, Monarto South—Sword.
J. Hartmann, Monarto South—Dundee.
P. B. Frahn, Monarto—Dundee, Sword.
H. A. Hein, Pallamana—Sword, Dundee, Ranee.
Hugo Paech, Rockleigh—Bencubbin.

TATIARA.

H. C. M. Pilgrim, Wolseley—Dundee.
Fisher Bros., Bordertown—Dundee, Ranee 4H.
E. W. Sharrad, Wolseley—Dundee, Ranee 4H, Barunga.
Menzie & Klien, Mundalla—Ranee 4H.
H. L. Hinge, Mundalla—Totadgin.
A. E. & E. B. Milne, Bordertown—Bencubbin.

BUXTON.

H. A. Cant, Kimba—Waratah.
C. G. & G. W. Cant, Kimba—Waratah.
C. R. Clements, Kimba—Waratah.

NORTHERN YORKE PENINSULA.

J. H. Robertson, Arthurton—Ranee 4H.
J. S. Henderson, Maitland—Ford.
G. E. & H. M. Meier, Paskeville—Sword.
M. C. Bussenchutt, Paskeville—Sword.
O. D. Jericho, Arthurton—Ford.
G. E. Rodda, Thrington—Ranee 4H.
Gardner Bros., Paskeville—Geeralying, Dundee.
L. R. Price, Paskeville—Bencubbin.
W. A. Harris, Thrington—Waratah.
C. Rodda, Thrington—Dundee.
N. J. Cross, Kadina—Dundee.

JERVOIS.

A. Spriggs, Cleve—Sword.
H. Rodda, Mangalo—Ranee.
J. C. Sims, Cleve—Ranee.

SOUTHERN YORKE PENINSULA.

H. Polkinghorne, Minlaton—Sword.
H. H. Glazbrook, Minlaton—Sword.
Alderman Bros., Minlaton—Ford, Sword.
E. H. Giles, Yorketown—Dundee, Baringa, Sword.
H. McBurney, Curramulka—Ranee 4H, Bobbin.
R. Page, Minlaton—Ford, Sword.
H. Lister, Minlaton—Sword.
L. W. Williams, Minlaton—Sword.
M. E. Correll, Minlaton—Ford.

CHANDOS.

J. T. W. Werner, Lameroo—Sword.
W. H. Cabot, Parrakie—Sword.
J. H. & C. H. Spratt, Lameroo—Sword, Ranee 4H.
J. L. Koch, Lameroo—Sword.

NORTHERN.

Competitor and Address. Varieties.
A. M. Mahood, Wirrabara—Ranee 4H.
Blieschke Bros., Murraytown—Ranee 4H.
P. L. Blesing & R. E. Woolford, Bangor—Baringa, Dundee.
H. K. Moore, Jamestown—Ranee 4H.
W. F. Wurst, Laura—Dundee.
J. C. Kleinig, Laura—Dundee, Nabawa.
J. W. Prior, Gladstone—Ranee 4H.
M. Holland, Caltowie—Sword, Dundee.
J. E. Lehmann, Caltowie—Bencubbin.
A. Crossman, Caltowie—Bencubbin.

MIDLANDS.

D. L. Clarke, Tarlee—Sword.
J. & D. Kelly, Giles's Corner—Dundee.
G. Hazel, Kapunda—Dundee.
W. J. Holding, Eudunda—Dundee.
W. E. Hansen, Eudunda—Dundee.
P. J. Scholz, Eudunda—Sword.
C. Behn & Sons, Riverton—Dundee, Ranee, Carrabin, Waratah.
S. H. Kelly, Riverton—Dundee.
F. Coleman, Saddleworth—Waratah.
E. J. Williams, Tothill's Creek—Ranee.
H. Thomas, Manoora—Gallipoli.
Theo. Vogt, Saddleworth—Dundee.
H. H. Bulbeck, Hilltown—Dundee.
L. J. Harvey, Hilltown—Dundee.
E. V. H. Wilsdon, Andrews—Dundee.
R. F. Thomas, Hallett—Gallipoli.

MIDLANDS—*continued.*

Competitor and Address. Varieties.
Gask Bros., Gum Creek, Kooringa—Dan.
L. A. Martin, Farrell's Flat—Dundee.
R. R. Bartholomaeus, Farrell's Flat—Dundee.
J. H. Torr, Farrell's Flat—Dundee.
G. T. Przibilla, Farrell's Flat—Dundee.
H. Miller, Farrell's Flat—Dundee.
S. Garrard, Merildin—Dundee.
J. Ross, Martindale Estate, Mintaro—Ghurka.
W. R. Woods & Sons, Mintaro—Dundee.

MID-NORTHERN.

W. P. R. Simon, Halbury—Sword.
A. Maitland, Rochester—Nabawa.
F. J. Pedler, Koolunga—Dundee.
H. S. & O. S. Freeman, Koolunga—Currawa.
Spencer Bros., Koolunga—Ranee 4H.
M. Smart & Son, Gulnare—Bencubbin.

FLINDERS.

W. H. Watkins, Yeelanna—Late Gluyas.
G. J. Cooper, Tumby Bay—Waratah.
R. R. Wilson, Yeelanna—Ford.
G. & A. Lawrie, Ungarra—Ford.
L. Modra, Yeelanna—Sword.
Myer Bros., Mount Hope—Ranee.

OATS.

CENTRAL.

E. W. Day, Reeves Plains—New Zealand Cape.

Fourth International Grassland Congress.

The Fourth International Grassland Congress is to be held in Great Britain in July, 1937, under the Presidency of Professor R. G. Stapledon, C.B.E., M.A., Director of the Welsh Plant Breeding Station and of the Imperial Bureau of Plant Genetics: Herbage Plants, Aberystwyth, Wales.

The Congress is to be held in collaboration with Der Vereinigung Internationaler Grunlandkongress (the International Grassland Congress Association), which has its central office in Leipzig, Germany (Secretary, Dr. Richard Geith).

Three Congresses have been held in other countries; the first was in Germany in 1927, and the second in Sweden and Denmark in 1930 under the title of "Conference of Grassland Farmers from Northern and Central European Countries." The third Congress was held in Switzerland in 1934 under the title of "Third Grassland Congress of the North and Central European Countries." Subsequent to the Third Conference at Zurich, the International Grassland Congress Association was formed with the object of carrying on the work of the Congress from one meeting to another. At Zurich also, an invitation was presented by the British delegation, asking that the Fourth Congress might come to Great Britain in 1937.

The Fourth Congress will be more extensive than the earlier Congresses, as specialists from the British Dominions and Colonies, the United States of America and numerous other countries outside Europe are being invited to take this opportunity of meeting prominent British and European investigators. The paper-reading sessions will be held in Aberystwyth from 13th to 19th July. Intending participants will be able to join in a tour of centres of grassland interest and selected farms both before and after the sessions.

Feeding Tests at Parafield Poultry Station

[By C. F. Anderson, Chief Poultry Adviser.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April, 1935, to 31st January, 1937.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal, 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

5. *Mash*, during autumn and winter.—Crushed barley, crushed wheat, chaffed greenfeed and meatmeal. During spring and summer the mash is varied, bran being substituted for the crushed barley.

Grain.—2ozs. wheat per day.

	No. Eggs Laid 1st April, 1935, to 31st December, 1936.	No. Eggs Laid Month of January, 1937.	Total Eggs Laid 1st April, 1935, to 31st January, 1937.
No. 1 Test	12,049	542	12,591
No. 2 Test	12,111	552	12,663
No. 3 Test	12,897	490	13,387
No. 4 Test	10,412	415	10,827
No. 5 Test	11,165	474	11,639

Canary Grass and Linseed.

Mr. R. C. Scott (Chief Agricultural Adviser) advises a subscriber to the *Journal of Agriculture* who sought information concerning the cultivation of canary grass and linseed that good rainfall and soil conditions are necessary for canary grass, and as an example in this State, the best crops are grown in the rich lands extending from Gawler through Kapunda, Saddleworth, and Clare. Planting operations are exactly the same as those required for wheat. The land should be fallowed and worked to a fine tilth prior to seeding. The seeding period would be the same as that for a late maturing wheat variety. The usual rate of planting is about 20lbs. of seed per acre and manured with approximately 1cwt. of superphosphate per acre. No varieties have been isolated, but in ordering one should state that canary seed (*Phalaris canariensis*) is required, in order to indicate that canary grass (*Phalaris tuberosa*) is not wanted.

Linseed is not likely to prove profitable. The experience in this State has been that linseed requires wet finishing conditions and fertile soils. The best crops have been grown on the irrigated Murray Swamp areas and the volcanic land near Mount Gambier. It has been tried by private farmers in a number of districts, but has been discarded, and to-day there is no linseed sown in South Australia.

There is a good market for the seed provided that it attains the standard for oil content set by the purchasers, but in the absence of flax mills the fibre is not saleable.

Canary seed and linseed would take the same plant foods from the soil as wheat.

Egg-Laying Competitions

Official Single Test conducted at Parafield

Review of the Competition for the month of January, 1937, by C. F. Anderson (Chief Poultry Adviser) and A. Clifton (Competition Attendant).

Weather conditions during January were almost ideal for egg production. It is particularly noticeable that, due probably to the cool weather experienced, the birds readily consumed the full ration of mash and wheat throughout the month, with a result that egg production was maintained at a high average, being 50 per cent. for the whole month.

It is also noticeable that the percentage of first-grade eggs for January has improved. This is probably due to the birds eating the full ration. The percentage of first grade eggs was 63 per cent., as against 61 per cent. for December.

When it is considered that 2ozs. are the minimum for first grade eggs, at this period the percentage is quite satisfactory. The daily average of eggs laid for the whole month was 238, of which 151 a day were first grade.

As the Competition advances, it is very evident that the Wet Mash Sections are much better than the Dry Mash birds, more so with regard to weight.

The team of White Leghorns, 7-12, owned by Mr. A. Young, have laid particularly well during the month, laying 116 first grade eggs and 9 under-weights. Present indications are that this team will show a record score for Parafield. It seems almost certain that the score will be in the vicinity of 1,300 first grade eggs at the conclusion of the competition.

The team of Black Orpingtons owned by the Willow Bend Stud Poultry Farm also laid well for the month, its score being 82 first grade eggs, but unfortunately, one of the birds was laying under-weight eggs.

It is most interesting to record that although the weather has been so abnormally cool for this time of the year, broodiness has been most pronounced, especially so in the Rhode Island Reds. The two leading birds in that section have spoilt the opportunity of a most creditable score through being continually in the broody pen.

There were three deaths during the month, making a total of 25 from 501 birds entered at the commencement of the competition.

LEADING SCORES TO 2nd FEBRUARY, 1937. —FIRST GRADE EGGS ONLY.

SECTION I.—WET MASH.

Class 1.—White Leghorns—351 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
C. A. Maxwell	229	315
J. G. Slee	224	346
S. Lambert	219	194
Trios—		
W. M. Field	595	142–144
L. A. King	595	217–219
A. O. Dawkins	584	85–87
A. Young	579	7–9
Teams—		
A. Young	1,120	7–12
W. M. Field	1,105	139–144
J. C. Normandale	1,073	235–240

Class 2.—Any other Light Breed (Minorcas)—15 birds competing.

Singles—		
R. M. Yelland	172	371
V. F. Gameau	171	366
R. M. Yelland	156	372
Trios—		
Langmaid and Bettison	397	358–360
R. M. Yelland	334	370–372
V. F. Gameau	301	364–366
Teams—		
Langmaid and Bettison	640	358–363
V. F. Gameau	444	364–369

Class 3.—Black Orpingtons—45 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
Willow Bend Stud Poultry Farm	221	381
A. G. Dawes	215	377
Willow Bend Stud Poultry Farm	205	380
Trios—		
Willow Bend Stud Poultry Farm	600	379–381
A. G. Dawes	537	376–378
H. J. Mills	518	385–387
Teams—		
Willow Bend Stud Poultry Farm	1,083	379–384
H. J. Mills	939	385–390
A. G. Dawes	906	373–378

Class 4.—Any other Heavy Breed—36 birds competing.

Singles—		
A. G. Dawes (Rhode Island Red)	198	419
A. G. Dawes (Rhode Island Red)	193	38
K. Pennack (Barnevelder)	186	438
Willow Bend Stud Poultry Farm (Rhode Island Red)	179	424
Trios—		
K. Pennack (Barnevelders)	503	436–438
V. F. Gameau (Rhode Island Reds)	388	433–435
Teams—		
V. F. Gameau (Rhode Island Reds)	674	430–435
A. G. Dawes (Rhode Island Reds)	654	37–42

SECTION II.—DRY MASH.

Class 5.—White Leghorns—15 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
A. O. Dawkins	216	449
A. O. Dawkins	200	452
A. O. Dawkins	184	453
Trios—		
A. O. Dawkins	536	451–453
A. O. Dawkins	523	448–450
Willow Bend Stud Poultry Farm	395	454–456
Teams—		
A. O. Dawkins	1,059	448–453
Willow Bend Stud Poultry Farm	652	454–459

Class 5—*continued.*

Class 7.—Black Orpingtons—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	184	468
Willow Bend Stud Poultry Farm	177	466
Trios—		
Willow Bend Stud Poultry Farm	464	466–468

Class 8.—Rhode Island Reds—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	129	470
Willow Bend Stud Poultry Farm	123	471
Trios—		
Willow Bend Stud Poultry Farm	360	469–471
Willow Bend Stud Poultry Farm	263	472–474
Teams—		
Willow Bend Stud Poultry Farm	623	469–474

SECTION III.—WET MASH.

Class 9.—Any Breed—27 birds competing.
(Home Project Utility Section.)

Name. School. Breed.		
Anthony Rix, Williamstown, White Leghorn	212	478
Warren Hannaford, Paracombe, White Leghorn	204	486
Keith Oliver, McLaren Vale, Black Orpington	194	498
Stanley Pratt, Abattoirs, White Leghorn	192	477

Farming in the Mallee.

At the December meeting of the Penwortham Branch, which was attended by 11 members, Mr. J. Chenoweth related some of his experiences of farming in the hundred of Hooper. The speaker made special reference to the valuable assistance that had been rendered settlers in that part of the Mallee by Sir George Ritchie and Messrs. Blacker and McDonald. Speaking of 25 years ago, Mr. Chenoweth said the only method of transport was with horse-drawn vehicles. He described the erection of tents and other makeshift buildings as temporary structures until the permanent sheds, &c., were erected and the rolling, cutting, and scrub clearing operations. Boring for water, road construction, stump picking, and other scrub farm work were explained by the speaker. The price of materials was a very big handicap, in some instances as much as £80 per ton having to be paid for galvanized iron. All those conditions he compared with the progress and improvements such as were to be seen at the present time. A generous tribute was paid by Mr. Chenoweth to the part that the wives and daughters of the settlers had played during the pioneering stages of the development of the Mallee. (Secretary, A. L. Wayman.)

Pasture Section of Dairy Farm Competitions, 1936-37.

[Judged by E. S. ALCOCK, District Agricultural Adviser.]

SOUTH-EASTERN DISTRICT.

In this section of the Dairy Farm Competitions conducted by the South Australian Committee of the Australian Dairy Produce Board, in conjunction with the Department of Agriculture, any dairyman milking at least 7 cows was entitled to enter, and certificates and first and second prizes of £3 3s. and £2 2s. respectively were awarded.

The pasture section was judged according to the following schedule:—

	Points.
Density and evenness of the sward	50
Composition of the pasture	50
Freedom from useless plants	25
Subdivision of grazing area	25
Utilisation of pasture growth	50

Details of points awarded to each competitor are shown in the following table:—

Position.	Name.	Density and Evenness. (50)	Suitability of Plants. (50)	Freedom from Weeds. (25)	Subdivision. (25)	Utilisation. (50)	Total. (200)
1	Wookey, R. J., Robe	41	43	25	23	42	174
2	Came, F. C., Kongorong	43	44	22	23	40	172
3	Chambers, W. K., Mil Lel	40	40	24	24	43	171
4	Stuckey, Mrs. G. D., Rendelsham	41	42	22	22	43	170
4	Wray, J. M., Hynam	40	40	23	23	44	170
6	Carter, H. H., Mundalla	38	39	23	24	39	163
7	Bartlett, M. J., Moorak	37	38	23	24	40	162
8	Moritz, H., Kalangadoo	38	39	22	22	40	161
8	Allen, A. H., Wandilo	36	38	23	23	41	161
10	Kemp, A. C., Katherleigh	40	40	23	21	36	160
11	Dean, G. L., Kalangadoo	35	37	21	20	39	152

The soil on which the winning entry was sown, said Mr. Alcock, varied from a good rich piece of black silt, part of a drained swamp, to some sandy rises rather low in fertility. The whole area had been regularly top-dressed for some years. The lower lying area was now covered with a dense mat of strawberry clover, rye grass, black medic, melilotus and a little *Phalaris* and couch grass. The paddocks had made great improvement during the last few years; the sole of grass had gradually thickened up until it was almost impossible to see any bare spaces at all. The pastures were not allowed to grow rank, for as soon as they were long enough they were cut for hay. This year they received a top-dressing of 2½cwts. of super per acre; 1cwt. in autumn and the remainder during spring. One paddock had some sulphate of ammonia and it responded very well indeed. The paddocks on the rising land did not carry such a good sole of feed and were used for grazing during winter. They were top-dressed with 1cwt. of super per acre and growth consisted of some Wimmera rye grass, a little cocksfoot, harestail, rooted catsear, sterile brome, burr medic, and patches of Kentucky blue. The whole area was very clean and free from weeds.

A paddock of 35 acres was sown with rye for hay, which was cut and chaffed for feeding to the stock. Thirty head of big stock were kept on this holding, excepting for a few weeks each year, when the cows had to be sent away in order to keep them in good health.

The pastures were excellent and very well managed.

Advisory Board of Agriculture

The monthly meeting of the Advisory Board of Agriculture was held on 27th January, 1937, there being present Hon. A. L. McEwin, M.L.C. (Chairman), Messrs. A. M. Dawkins, P. J. Baily, F. Coleman, R. H. Martin, H. N. Wicks, S. Shepherd, A. J. A. Koch, Professor J. Perkins, and the Secretary, H. C. Pritchard. Apologies were received from Messrs. W. J. Spafford and A. J. Cooke.

Leave of Absence.—The Secretary reported that the Minister had approved of 6 months leave of absence from Board meetings for Mr. J. Wallace Sandford.

New Branches.—Approval was given for the formation of a Branch of the Bureau at Robe with the following Foundation Members:—J. Ryan, S. G. Brown, A. Dawson, A. Fidge, J. Watson, A. C. McIntyre, N. Hayes, S. C. Bradley, R. Dawson, F. H. Banks, C. J. McBain, and H. A. Fidge.

Conditional approval was given to form a Branch at Summerfield.

Life Members.—In recognition of 20 years' membership, Messrs. W. A. Hacklin, W. F. Roads, D. A. Nosworthy (Inman Valley), and W. P. Barry (Bundaleer Springs) were made Life Members of the Agricultural Bureau.

New Members.—The following names were added to the rolls of existing Branches:—Alma—A. M. Ross; Balhannah Women's—Miss A. Warland, Mrs. Fred Aubrey; Balumbah—J. Nugent, H. Wohling, R. Clements; Belalie Women's—Mrs. Luck, Mrs. Murchland; Berri—R. L. Rainbow; Chapman's Bore—F. Kilford, H. Kilford, B. Carslake, H. Carslake, M. Carslake; Coomandook—F. R. McArdle; Coonalpyn—H. Dunthorne; Coonawarra—John Grant, Frederick Lang, Ernest Redman; Coonawarra Women's—Mrs. J. Hinton, Miss C. Childs, Miss M. Redman, Miss G. Darwent, Mrs. T. Redman, Mrs. K. Ey; Cungena—A. C. McAvaney; Georgetown Women's—Mrs. Hinton; Gladstone—Roy Lines; Inman Valley—L. Lawrie, J. G. Schriever; Ironbank—Paterson; Kalangadoo Women's—Miss Dangerfield, Mrs. E. J. Davies; Kybybolite—M. O'Neill; Kybybolite Women's—Mrs. W. C. Johnston; Lenswood and Forest Range—D. Fry, W. Smith, H. Cook; Lone Pine—H. P. Stopp; McLaren Flat—K S. Bagshaw, E. Strout, B. Powell; Milang Women's—Miss G. Moar, Miss G. M. Stoner, Mrs. A. K. Duncan; Mount Compass—T. E. Walker; Mount Gambier—J. B. Barrows, F. Lock, Alex. Alcock, C. Perkins, W. B. Johnston; Mount Pleasant—A. A. McArdle; Mudamuckla—E. Whyborn; Narrung—G. A. McNicol; Nunjikompita—G. Pascoe, H. Pascoe, A. Pascoe, J. Pascoe, N. Pascoe; Renmark North and Chaffey—W. E. Wood, A. J. Heard, A. W. Madgett; Sheoak Log Women's—Mrs. E. Koch; Smithville Women's—Mrs. E. K. Nairn; Snowtown—A. W. Morris; Strathalbyn—A. G. Lee, Reg. Hall; Strathalbyn Women's—Mrs. J. R. Rankine, Mrs. R. H. Westley; Tantanoola—T. C. Hookings, A. Hookings, D. McNamee, R. White, E. D. Kiely; Taplan Women's—Miss D. Schwerdt, Miss K. Schwerdt; Weavers—L. C. Couch; Wepowie Women's—Mrs. M. Duffy; Willowie—Ross Gum, Rex Jared, Len H. Mills; Willowie Women's—Mrs. J. H. Schmidt, Mrs. H. Bartlett, Mrs. C. Michael, Mrs. I. McCallum, Mrs. A. Bartlett, Miss S. Crisp; Wirrabara Women's—Mrs. J. Hammill, Mrs. R. Edwards.

Several items were taken in Committee.

Emulsification of Olive Oil in Dipping Solutions for Sultanas.

(Note issued by the Fruit Processing Committee.)

GENERAL.

Olive oil is invariably used in the dipping solutions into which sultanas are immersed prior to drying. Until the last two years, the vine growers made their own emulsions, by stirring the olive oil into a weak solution of Carbonate of Potash. At the present time, stable prepared emulsions, in which the oil globules are very much smaller, have been placed on the market by various proprietary firms. During the 1936 season, the relative merits of prepared stable emulsions, in comparison with "home-made emulsions," were investigated by Mr. E. C. Orton, of the Commonwealth Research Station, Merbein. The results of Mr. Orton's work have recently been presented in an interim report.

DIPPING INVESTIGATIONS.

The full range of the investigations cover all phases of dipping, including variations in the quantities of all substances used in the dips, the objective being to obtain evidence regarding the exact functions of olive oil, potash, and caustic soda, in both cold and mixed dips. No alterations in the method of preparing these dips are suggested until further progress has been made in the work outlined above. On the other hand, as the prepared emulsions are now replacing "home-made" emulsions, a note on the results obtained is of immediate interest.

OLIVE OIL EMULSIONS.

A disadvantage of home-made emulsions arises at times from "free oil," particularly in the cold dip when first used. Also, the oil is removed from the dip relatively faster than the other ingredients and needs additions from time to time. These are difficulties completely overcome when the oil is used as a stable emulsion. In large scale trials, no additions were found necessary. Identical results were obtained from cheap and expensive brands of olive oil when used as a stable prepared emulsion; whereas, for home-made emulsions, a good quality oil, easily emulsified, is essential. It has been previously established that within limits, the drying rate becomes faster as the quantity of oil in the cold dip is increased. A similar result was obtained with prepared emulsions. No alteration in the amount of olive oil at present recommended is suggested. Any decrease in the quantity of oil applied to the fruit in a cold dip is definitely dangerous, in that the drying rate may be reduced to the point that handling costs become excessive, particularly if wet weather intervenes.

The present finding in reference to quality, is that the fine stable emulsions give, in the cold dip, slightly better results. The difference in mixed dips is not nearly so noticeable.

RECOMMENDATIONS.

1. When prepared stable emulsions are used in the dips for sultanas, the quantity of actual oil should be similar to the quantity at present recommended in standard formulae for cold and mixed dips.
2. The quantity of oil in the emulsion must be known to the user, in order that correct quantities can be incorporated in the dips.

Sudan Grass—Its Value as a Fodder for Livestock.

Asking for information regarding the value of Sudan grass for livestock, the effect on animals allowed to graze on the crop and when to sow, the Blackheath Branch of the Agricultural Bureau has been advised by Mr. W. J. Spafford (Director of Agriculture) that Sudan grass is a first-class foodstuff for farm stock when fed in the green state, and as is disclosed in the figures on the next page, its analysis is very similar to that of green oats.

The *Starch Equivalent* values of foodstuffs of the same kind are strictly comparable, and show the values of the materials from a fattening point of view. The figures for *nutrient ratio* show whether a foodstuff is of a fattening nature or is essentially a milk producer, or is well balanced for both fat and milk production.

The following figures show that Sudan grass and green oats are very similar in nature, having just about the same starch equivalent values and nutrient ratios, whereas green maize is more fattening (starch equivalent 13.7) but less valuable for the production of milk (wide nutrient ratio of 1 to 11.7).

Pure stands of Sudan grass can be grazed with perfect safety by farm livestock, but unfortunately some samples of seed contain cross-breds between Sudan grass and ordinary forage sorghum, and when these plants are plentiful there is some danger when grown in rich organic soils. Great care should always be exercised to make certain that good pure Sudan grass seed is purchased.

Sudan grass should be sown in spring after the soil is warm, which is usually late September or October in South Australia. The seed can be sown at any time in the summer after a big rain has been received.

Comparison of Sudan Grass and Oats.

	Sudan Grass (Green).	Maize, (Green).	Oats (Green).
	%	%	%
Composition—			
Water	75·0	75·0	75·0
Ash	4·2	2·2	2·3
Crude Protein	4·1	2·0	3·6
Fat	0·9	0·6	0·8
Carbohydrates	9·3	12·9	12·4
Fibre	6·5	7·3	5·9
Digestible Nutrients—			
Crude Protein	2·5	1·3	2·7
Fat	0·8	0·4	0·6
Carbohydrates	7·3	9·4	7·8
Fibre	3·9	4·9	3·5
Starch Equivalent	12·9	13·7	13·0
Nutrient Ratio	1 to 5·2	1 to 11·7	1 to 4·7

Arsenate of Lead.

Samples of locally procured arsenates of lead were collected towards the end of last year by the Department of Agriculture, and were submitted to the Department of Chemistry for analyses and suspension tests. The results obtained were as follows:—

	Moisture.	Lead Oxide.	Total Arsenic expressed as As_2O_5.	Water Soluble Arsenic expressed as As_2O_5.
1. Cooper's Arsinette Powder	1·0	60·2	31·2	0·32
2. Blair's Powder	0·8	65·6	30·4	0·34
3. "Elephant" Powder	0·8	63·0	32·3	0·18
4. Blair's "Lunevale" Powder	0·2	64·3	33·2	0·22
5. Hemingway's Powder	0·3	64·7	32·3	0·22
6. Berger's Powder	0·7	62·4	31·4	0·14
9. Palmprest Powder	0·4	64·7	32·8	0·11
10. Bickford's "Aero" Powder	0·7	64·7	32·1	0·22
12. "Bluebell" Powder	0·8	63·0	32·8	0·22
15. "Vallo" Powder	0·4	64·1	33·0	0·45
7. Berger's Paste	41·7	37·6	19·3	0·18
8. Berger's Colloidal	47·8	32·4	16·6	0·054
11. Bickford's "Aero" Paste	45·9	34·7	17·5	0·13
13. "Bluebell" Paste	46·6	34·1	17·8	0·072
14. Vallo Paste	48·9	32·8	17·1	0·22

ON MOISTURE FREE BASIS.

Brand.	Lead Oxide.	Total Arsenic expressed as As_2O_5.	Water Soluble Arsenic expressed as As_2O_5.	Suspension Tests.	
				5 mins.	30 mins.
	%	%	%	%	%
1. Coopers' Arsinette Powder	60·8	31·5	0·32	84·3	79·1
2. Blair's Powder	66·1	30·7	0·34	27·8	20·9
3. "Elephant" Powder	63·5	32·6	0·18	92·7	74·7
4. Blair's "Lunevale" Powder	64·4	33·3	0·22	65·0	21·2
5. Hemmingway's Powder	64·9	32·4	0·22	61·6	25·6
6. Berger's Powder	62·9	31·6	0·14	80·5	36·3
9. Palmprest Powder	65·0	32·9	0·11	53·7	28·8
10. Bickford's "Aero" Powder	65·2	32·3	0·22	65·8	41·6
12. "Bluebell" Powder	63·5	33·1	0·22	93·8	79·4
15. "Vallo" Powder	64·4	33·1	0·45	90·8	51·6
7. Berger's Paste	64·4	33·1	0·31	95·8	88·8
8. Berger's Colloidal	62·1	31·8	0·10	95·7	91·3
11. Bickford's "Aero" Paste	64·2	32·4	0·24	97·9	94·1
13. "Bluebell" Paste	63·8	33·3	0·13	98·1	90·9
14. Vallo Paste	64·1	33·4	0·43	89·5	51·5

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of January, 1937; also the average precipitation for January, and the average annual rainfall.

Station.	For Jan., 1937.	Av'ge. for Jan.	Total Rainfall, 1936.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	0·30	0·55	4·40	4·60
Marree	2·14	0·40	4·55	5·80
Farina	2·43	0·49	4·21	6·37
Copley	1·54	0·53	5·23	7·76
Beltana	1·79	0·64	5·72	8·39
Blinman	3·43	0·87	6·75	11·71
Hookina	4·71	0·50	8·38	10·94
Hawker	6·18	0·56	8·90	12·09
Wilson	5·46	0·60	10·59	11·65
Gordon	4·85	0·57	7·19	10·33
Quorn	3·70	0·62	8·56	13·10
Port Augusta	2·60	0·54	7·72	9·40
Bruce	3·93	0·51	11·34	9·74
Hammond	3·08	0·60	9·91	11·05
Wilmington	4·01	0·80	16·56	17·18
Willowie	3·49	0·47	10·25	12·10
Melrose	3·66	1·14	22·22	22·80
Booleroo Centre	3·56	0·75	12·18	15·14
Port Germein	2·45	0·64	11·03	12·51
Wirrabara	3·15	0·70	14·08	19·22
Appila	2·95	0·64	12·08	14·59
Cradock	4·70	0·57	8·05	10·67
Carrieton	3·71	0·72	9·39	12·11
Johnburg	4·72	0·57	9·39	10·49
Eurelia	3·54	0·74	10·18	12·66
Orroroo	3·91	0·93	11·59	13·12
Nackara	4·37	0·66	11·50	11·09
Black Rock	3·06	0·67	10·72	12·26
Oodlawirra	3·86	0·64	11·76	11·34
Peterborough	2·87	0·79	11·25	13·14
Yongala	3·41	0·67	13·90	14·37
North-East.				
Yunta	4·79	0·59	8·37	8·44
Waukaringa	5·11	0·48	9·16	7·82
Mannahill	4·06	0·59	6·86	8·08
Cockburn	3·39	0·59	9·48	7·81
Broken Hill	3·01	0·65	8·20	9·40
Lower North.				
Port Pirie	2·16	0·66	12·01	13·18
Port Broughton	1·77	0·59	11·46	13·87
Bute	1·49	0·59	12·50	15·42
Laura	2·83	0·73	14·69	17·93
Caltowie	2·64	0·69	13·31	16·69
Jamestown	3·38	0·69	14·88	17·68
Gladstone	2·85	0·68	12·39	16·31
Crystal Brook	2·63	0·70	12·21	15·79
Georgetown	2·91	0·69	13·85	18·24
Narridy	2·87	0·55	10·97	15·74
Redhill	2·28	0·62	15·81	16·55
Spalding	2·82	0·62	12·85	18·68
Gulnare	2·55	0·66	13·95	18·51
Yacka	2·60	0·52	13·17	15·38
Koolunga	2·28	0·61	11·26	15·29
Snowtown	1·81	0·62	14·58	15·69

Station.	For Jan., 1936.	Av'ge. for Jan.	Total Rainfall, 1936.	Av'ge. Annual Rainfall.
Lower North—*continued*.				
Brinkworth	1·78	0·54	11·16	15·72
Blyth	1·65	0·70	14·20	16·73
Clare	2·52	0·89	23·37	24·43
Mintaro	2·15	0·66	21·55	23·30
Watervale	3·01	0·94	25·23	26·69
Auburn	2·33	0·98	21·44	23·92
Hoyleton	2·27	0·74	17·61	17·25
Balaklava	1·93	0·66	11·67	15·41
Port Wakefield	1·47	0·56	11·18	12·93
Terowie	3·08	0·74	14·02	13·27
Whyte-Yarcowie	2·82	0·74	14·35	13·54
Hallett	2·73	0·70	14·92	16·39
Mount Bryan	2·38	0·60	16·10	16·76
Kooringa	1·91	0·73	15·33	17·78
Farrell's Flat	2·46	0·74	17·86	18·52
West of Murray Range.				
Manoora	1·86	0·65	17·03	18·91
Saddleworth	2·33	0·76	20·93	19·56
Marrabel	2·39	0·74	19·20	19·91
Riverton	2·10	0·75	20·96	20·79
Tarlee	1·93	0·75	18·21	18·06
Stockport	1·77	0·73	17·89	17·02
Hamley Bridge	1·77	0·75	15·44	16·52
Kapunda	1·75	0·83	17·98	19·74
Freeling	1·64	0·74	14·60	17·79
Greenock	2·05	0·78	18·92	21·47
Truro	1·60	0·73	18·04	19·75
Stockwell	1·80	0·71	18·08	20·02
Nuriootpa	2·41	0·78	22·02	20·74
Angaston	2·45	0·80	20·54	22·33
Tanunda	2·63	0·85	19·88	21·97
Lyndoch	2·50	0·75	17·65	23·28
Williamstown	3·25	0·91	20·19	27·54
Adelaide Plains.				
Owen	1·69	0·54	15·38	14·78
Mallala	1·35	0·68	14·14	16·43
Roseworthy	1·67	0·71	14·25	17·43
Gawler	2·39	0·72	15·50	18·85
Two Wells	1·52	0·64	12·79	15·80
Virginia	2·13	0·69	14·63	17·22
Smithfield	3·70	0·53	15·28	17·68
Salisbury	2·93	0·69	14·52	18·55
Adelaide	2·42	0·72	19·34	21·17
Glen Osmond	2·99	0·91	20·37	25·97
Magill	2·56	0·83	19·99	25·36
Mount Lofty Ranges.				
Teatree Gully	3·46	0·81	19·15	27·03
Stirling West	4·94	1·50	38·97	47·01
Uraidla	4·08	1·32	34·96	43·83
Clarendon	2·65	1·07	28·14	32·81
Happy Val'y Res.	2·40	—	21·28	—
Morphett Vale	1·91	0·73	19·77	22·62
Noarlunga	1·73	0·59	20·34	20·35
Willunga	2·08	0·76	22·14	25·96
Aldinga	1·88	0·54	16·03	20·21

RAINFALL—*continued.*

Station.	For Jan., 1936.	Av'ge. for Jan.	Total Rain-fall, 1936.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	2·76	0·71	22 99	29·72
Inman Valley .	2·44	-	24 76	—
Yankalilla	2·03	0·57	19·08	22·78
Mount Compass	2·81	0·86	27·99	36 25
Mount Pleasant	3·21	0·89	23·49	27·08
Birdwood	3·07	1·00	21 38	29 02
Gumeracha ...	4·35	1·06	22 35	33·28
Millbrook Res..	4 75	1·13	24·13	34·50
Lobethal	4 51	1·03	28·28	35·94
Woodside	3 28	1·00	24·39	32 16
Hahndorf	4·17	1·06	26·17	34·82
Nairne	3·34	0·98	23·05	28·14
Mount Barker	3 31	1·03	25 59	31·24
Echunga	3·56	1·07	30 37	33 30
Macclesfield ..	2 42	0·93	26·45	30·37
Meadows	2·69	1·05	31·65	36·02
Strathalbyn ..	1·82	0·70	20·16	19 34
MURRAY FLATS AND VALLEY.				
Meningie......	1·39	0·62	16·94	18·29
Milang	1·71	0·59	15·05	14·85
Langhorne's Ck	1·96	0·48	17·80	14·93
Wellington ...	1·85	0 71	15·86	14·66
Tailem Bend ..	2·10	0·60	18 27	15 07
Murray Bridge	1·44	0·56	14·54	13·49
Callington	2·09	0·67	14·98	15·14
Mannum	1·42	0·50	12·80	11·49
Palmer	2·06	0·60	18·28	15·63
Sedan	1·33	0·58	10·67	12·01
Swan Reach...	1·20	0·50	9 94	10·62
Blanchetown ..	1·20	0·72	12·04	10·95
Eudunda	1·82	0·72	18·69	17·13
Point Pass ...	1·73	0·65	20·63	16·66
Sutherlands ..	1·59	0·44	11·29	10·71
Morgan	1·44	0·50	9·96	9·10
Waikerie......	1·39	0·46	14·11	9·59
Overland Corner	1·14	0·54	11·76	10·18
Loxton	1·06	0·64	11·32	11·34
Berri	1·34	0·60	11·81	10·03
Renmark	2·18	0 54	11·92	10·33
WEST OF SPENCER'S GULF.				
Eucla	0·25	0·56	8·52	10·08
Nullarbor	0·30	0·34	4·87	8·87
Fowler's Bay .	0·22	0·35	9·42	11·93
Penong	0·23	0·29	10·27	12·28
Koonibba	0·30	0·27	11·59	12·18
Denial Bay ...	0·31	0·20	11·01	11·33
Ceduna	0·24	0·20	9·62	10·32
Smoky Bay ...	0·08	0·22	8·67	10·50
Wirrulla	0·50	0·18	8·56	10·87
Streaky Bay ..	0·38	0·38	11·29	14·91
Chandada	0·31	0·19	9·83	12·66
Minnipa	1·30	0·51	10·96	13·97
Kyancutta ...	0·69	0·31	11·42	13 45
Talia	0·51	0·24	10·62	14·76
Port Elliston .	0·45	0·36	11·84	16 53
Lock	0·77	0·44	11·99	16·44
Mount Hope ..	0·57	—	13·67	—
Yeelanna	0·70	0·22	11·73	16·11
Cummins	0·62	0·32	12·53	17·70
Port Lincoln..	0·93	0·54	14·18	19·35
Tumby	0·67	0·28	10·52	14·29
Ungarra	0·92	0·32	13·40	16·94
Port Neil	0·95	0·30	10·20	13·16
WEST OF SPENCERS GULF—*continued.*				
Arno Bay	0·93	0·38	9·95	12·82
Rudall	0·82	0·47	9·74	13·23
Cleve	0·80	0·52	11·81	14·96
Cowell	1·01	0·46	10·97	11·06
Miltalie	1·16	0·54	12·34	13·75
Mangalo	0·96	0·59	11·87	13·86
Darke's Peak ...	0·99	0·59	11·67	15·24
Kimba	1·11	0·38	8·59	11·84
YORKE PENINSULA.				
Wallaroo	1·26	0·54	11·42	13·97
Kadina	1·28	0·51	11·85	15·59
Moonta	1·31	0·51	11·16	15·04
Paskeville.......	1·42	0·56	17·03	15·44
Maitland........	1·47	0·61	13·78	19 86
Ardrossan.......	1·78	0·47	10·86	13·96
Port Victoria ...	1·10	0·44	11·75	15·39
Curramulka	1·32	0·54	13·33	17·81
Minlaton........	1·38	0·48	13·44	17·72
Port Vincent ...	1·02	0 38	10·56	14·37
Brentwood	1·03	0 33	12 35	15 61
Stansbury	1·34	0·53	13 40	16·81
Warooka	1 16	0·41	13·67	17·44
Yorketown	0·91	0·44	12·55	16·88
Edithburgh	1·13	0·47	12·10	16 38
SOUTH AND SOUTH-EAST.				
Cape Borda	0·89	0·59	22 68	24 87
Kingscote	1·01	0·44	15·14	19·27
Penneshaw	1·22	0·41	17 01	19·18
Victor Harbour .	2·59	0·68.	17·84	21·43
Port Elliot	2·69	0·64	19 02	19·94
Goolwa	2·48	0·65	18 22	17 84
Maggea	1·28	0·89	13·26	10 02
Copeville	1·73	0·58	14·66	11·51
Claypans	1·15	0·86	12·97	10 53
Meribah	1 17	0·75	13 40	11·11
Alawoona	1·32	0·80	12·81	10 26
Caliph	1·23	0·87	11·58	10 44
Mindarie	1·23	0·64	12·72	12·13
Sandalwood	1·46	0·76	15·16	13·60
Karoonda	1·56	0·60	17·15	14·18
Pinnaroo	1·38	0·53	12·62	14·19
Parilla..........	1·47	0·51	14·23	13·64
Lameroo	1·34	0·59	15·74	15·79
Parrakie	1·23	0·50	13·44	14·61
Geranium	1·45	0·54	14·35	16·39
Peake	1·86	0·60	13·89	15·95
Cooke's Plains ..	1·99	0·58	16·74	15·29
Coomandook	1·74	0·55	16·36	17·03
Coonalpyn	1·85	0·75	17·65	17·65
Tintinara	2·16	0·51	17·45	18·72
Keith	1·88	0·46	17·74	17·96
Bordertown	2·40	0·73	20·32	19·14
Wolseley........	1·83	0·60	20·12	18·47
Frances.........	2·31	0·67	23·30	20·12
Naracoorte	2·19	0·79	21·45	22·65
Penola	2·63	1·00	22·66	25·94
Lucindale	3·29	0·72	24·28	23·47
Kingston	2·10	0·73	24·07	24·24
Robe	1·71	0·77	23·24	24·65
Beachport	2·32	0·83	26·73	27·07
Millicent	2·99	0·95	33·34	29·87
Kalangadoo	3·30	1·12	31·15	32·05
Mount Gambier.	2·19	1·30	26·86	30·34

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Berri, 18th January, "Fruit Drying"—F. R. Arndt; Blackheath, 31st December, Paper from *Journal*; Blewitt Springs, 26th January, "Prune and Currant Growing"—W. L. Townsend; Currency Creek, 1st December, "Phosphatic Fertilisers"—W. Ellis; Hartley, 27th January, "Waste on the Farm"—H. B. Wundersitz; Ironbank, 30th December, Field Day; Marama, 23rd January, Congress Paper; Millicent, 20th November, Preparing Bureau Exhibit; Monarto South, 16th January, Weighing Wheat Samples; Myponga, 21st January, "Care of Eggs"—E. L. Osborne; Penwortham, 16th December, "Pioneering in the Mallee"—J. Chenoweth, 20th January, "New Zealand"—R. C. Scott; Watervale, 17th August, Discussion, 28th September, Congress Report, 19th October, Grafting Demonstration, 14th January, Discussion; Weavers, 11th January, Harvest Reports; Williamstown, 26th November, "Agricultural High School Course" A. R. Ninnes.

Fruit Growing at McLaren Flat.

Currant Industry.

The January meeting of the Blewett Springs Branch was held at the residence of the President (Mr. L. DuBois) and was attended by 16 members. Mr. W. L. Townsend of McLaren Flat read the following interesting paper:—

The currant industry was started at McLaren Flat by the late Thomas Hardy in 1880 when he planted currants in the vineyard known as "Leslies," a 10-acre block. He also planted Glen Hardy a year later—1881. The vines were planted 24ft. x 12ft., and as there were several misses in the piece, several vines ran 48ft. along the trellis. Portion of these currants were of the Zante variety and the remainder those known as "Cape" currants.

Ten years later, Mr. G. Bell planted 3 acres, and the following year the late Mr. F. Low planted 2 acres; these were the first currants planted on a commercial scale at McLaren Flat. There were several vines in the district before this, but as the owners did not understand trellising and pruning they were not a success. There was such a demand from Renmark for currant cuttings that the only cuttings that could be obtained by local growers were from the rejects.

Nothing was known about cincturing, but as the vines were planted a long way apart and did not make rank growth, they seemed to set fairly well, and from 15cwts. to 1 ton of dried fruit per acre were harvested. Oidium gave a good deal of trouble, and the sulphur was not equal to that used nowadays. The ploughs for cultivating, &c., were the same as those used by farmers. Growers had a free hand to sell the currants when and where they pleased, and as the price was about 4½d. to 5d. per pound, we managed to balance the budget.

The currants were all dried on wooden trays, and as they had several acres of trays at Mr. T. Hardy's drying ground, it will be realised the work involved in packing up when it rained. Last year this district produced about 800 tons of currants, and at £30 per ton, £24,000 came into the district from currants alone.

Cincturing was started in 1890; Mr. Hardy also introduced this and imported a tool from Greece to do the job. The vines were cinctured as follows:—One row with the machine taking a piece of bark out about a quarter of an inch wide, the next row the rods only were cinctured, and the third row left untouched, right across the block. At the present time there are approximately 1,200 acres of vines in the district, and every vine is cinctured.

The Prune Industry.

The late Mr. Thomas Hardy also started prune growing in the McLaren Vale district in the vineyard known as "Glen Hardy," where he planted a good number of trees, the variety being chiefly Angelina Burdett, not a very good variety. However, as there were very few grown in South Australia in those days, they sold at a fair price. About 40 years ago Mr. Gerald Ward planted several acres on the property now owned by Mrs. F. Bell. At present, supply exceeds demand, and growers either have to export a percentage or take a very low price for them, which would not pay for producing, and if they wish to export, the fruit must be of very best quality—good, large prunes, well dried.

Drying Prunes.

One of the most important details in drying prunes is the dip. Prunes that are on big, shady trees, do not want as strong a dip as those on trees that have little foliage. I favour a dip of 1lb. of caustic to 40 or 50galls. of water. Have the dip on the weak side rather than too strong. Prunes that are not thoroughly ripe will not dry nicely. The best variety of prune for this district seems to be De Agen. Splendor is a good prune but does not bear every year in this district. The method we adopt in dipping is to have the water just under boiling point, and leave the fruit in the dip for about 5 seconds.

Care must be taken to handle them carefully both before dipping and after, as, after dipping the skin is easily damaged. There is a good demand for good prunes, and the demand will increase considerably. With proper methods of pruning, cultivating, and manuring, the growers can improve the quality of the prunes. The extra price that is obtained for good, large fruit pays for a little extra work and manure. The price last year was about £35 per ton for 40's and 50's, while the price for small fruit was about £20 per ton, and a grocer can sell 1cwt. of good prunes easier than he can sell ½cwt of poor quality. In growing prunes there is always a small percentage that drop before they are matured or ripe; these should be gathered and fed to pigs or buried. On no account should they be left under the trees and so become mixed with the good fruit. If prunes are dried on wooden trays they should be stacked for 2 days or so, but left in the sun for about 1 hour for the outside moisture to dry off, otherwise mould may develop. When thoroughly dry, they should be put in boxes to sweat out and even up. The method of drying prunes on small mesh wire-netting racks seems to be a good one. The prune pool advises the burying of all small prunes over 120 to the pound, so that it behoves every grower to try and increase size and improve quality. (Secretary, C. Air.)

Women's Branches.

OWEN.

Mr. J. B. Harris (District Agricultural Adviser) gave an address and demonstration of Fruit Preserving at the meeting held on 12th November. (Secretary, Miss Lake.)

PARILLA.

The meeting of 9th October was held at the residence of the Messrs. Colwill Bros., when a demonstration of wreath making was given by Mrs. F. Atze, of the Karte Branch. At the November meeting the report of the delegates to the Annual Congress was received and discussed. (Secretary, Mrs. R. Welden.)

WILKAWATT.

On 17th November, members met at the residence of Mrs. E. Brooker. The following officers were elected for the ensuing year:—President, Mrs. A. Young; Vice-Presidents, Mesdames H. Pritchard and E Brooker; Secretary, Mrs. J. Sumsion.

At the meeting held on 10th December, each member brought along something suitable for a Christmas gift.

WILLOWIE.

Members from the Morchard Branch attended the Willowie meeting which was held on 24th November. Mrs. B. McCallum gave a talk on Christmas novelties and displayed about 50 articles. Miss F. Brown of Morchard then read a paper on "Jelly Making" and Mrs. Martin spoke on Christmas gifts. (Secretary, Mrs. W. Foulis).

WILMINGTON.

The meeting of the 12th November was attended by 38 members and visitors. Mrs. Pengilly presided and Mrs. Schmidt of the Gladstone Branch read two papers. The following are the results of the Cake Competition:—Sponge sandwich—1st, Mrs Bury; 2nd, Mrs. W. Zwar. Ribbon cake—1st, Mrs. Bury; 2nd, Mrs. G. Nell. Cream puffs—1st, Mrs. Zwar; 2nd, Mrs. Pengilly. Bread—1st, Mrs. Bury; 2nd, Mrs. Pitt Scones—1st, Mrs. Bury; 2nd, Mrs. Pengilly. Sponge sandwich (Girls)—1st, Miss Bury. Chocolate sponge—1st, Mrs. Pengilly. The trophy for the highest aggregate points was won by Mrs. Bury. (Secretary, Mrs. P. Cole.)

JOURNAL
OF THE
Department of Agriculture
OF
South Australia

VOL. XL. MARCH, 1937. No. 8

Published Monthly by the Department of Agriculture Edited by H. C. PRITCHARD

Page

Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836-1936 601-611
Cereal and Manurial Experiments in South Australia 612-626
Mould in Citrus Fruits 627-634
The Development of Red Gum Lands 635-649
Does Poultry Keeping Pay at Present Prices 650-651
Fertilisers Act, 1918—Analyses of Fertilisers 652-660
Egg-Laying Competitions 661-662
Phosphatic Manure 664-665
Agricultural Bureau of South Australia—Conferences 666-667
Advisory Board 668
Rainfall Table 669-670
Bureau Reports 671-678

WOMEN'S BRANCHES.

Bureau Reports 678-682

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1937

South-East (Lower), at Coonawarra, Wednesday, 14th April (Mr. John M. Kain).

Dairying, at Lobethal, Thursday, 13th May (Mr. B. Schapel).

River Murray, at Waikerie, Thursday, 17th June (Mr. F. B. Harden).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.					
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	
1937.	February.	March.	February.	Feb.-Mar.	June-July.	
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	
Feb. 18..	5 4⅞	5 4½	5 8⅝	5 2¾	5 1½	Parcel—Plate wheat sold to Germany, price not disclosed; half cargo Australian sold for Shanghai, price not disclosed.
Feb. 25..	5 4½	5 4⅛	5 7	5 1¾	5 1⅛	—
	March.		March.	Mar.-April.	May-June.	
Mar. 4..	5 6⅜	5 6	5 8¼	5 5⅜	5 3⅜	Parcel—New South Wales, 4,000 tons afloat at 5s. 5¼d.
Mar. 11..	5 8⅝	5 7½	5 11¼	5 8¼	5 5¼	Australian wheat, 8,250 tons (June), 5s. 7⅜d. Cargo plate wheat to Italy and 35,000 tons Canadian wheat to Germany, prices not disclosed. Part cargo Victorian (afloat), 5s. 6¾d. South Australian, 250 tons and 500 tons (both afloat), at 5s. 7⅞d. Western Australia, 4,000 tons (March), 5s. 7⅛d.

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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By ARTHUR J. PERKINS, Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 561.)

THE FIRST DECADE, 1836-1846.

CHAPTER III.—(continued).

Supposed loss of second consecutive season—Sealer and whaler settlers of Kangaroo Island—Exaggerated expectations as to mean grain yields—Light's early but unsuccessful importation of sheep—Rapid Bay vegetable garden—Stevenson's Addresses on early Agricultural experiences—Danger of translating returns from small fractions of an acre into bushels per acre—General anxiety as to probable productivity of South Australian soils—Sturt's condemnation of Adelaide Plains—Early fears of effects on crops of hot north winds—"Seeding-Time"—The vine and the olive; the fig and the almond, etc.

George Stevenson was convinced champion of the superiority of South Australia over the neighbouring Colonies in the matter both of fundamental political principles and of potential productivity of climate and soil: and long and hard had he fought for his viewpoint in the pages of the journal over which he presided as editor, avowed or cryptic, for six consecutive years. (7) Hence it was no accidental occurrence that at the very outset of these Agricultural

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(7) *South Australian Register*, 6th August, 1842, page 2, column 2.

Addresses, we should find him discoursing on his favourite topic, albeit in studiedly restrained language, which his proof-readers must scarce have recognised as his own: and yet whilst commiserating drought-stricken New South Wales, he could not help rubbing his hands over the rustic felicity of South Australia, whose cattle and sheep lazed by "living streams and running brooks," whilst those of New South Wales lay "dying beside exhausted waterholes." But "we cannot of course refer to personal experience of a tract of years," said he: and in the circumstances was it not strange that a man of Stevenson's insight should have ventured to dogmatise upon premises so slender as the inadequate experience of three consecutive seasons only, unless indeed he had in mind "to split the ears of the groundlings" of his audience? But we to whom it has been granted to cast privileged glances upon the progressive unfolding of one hundred successive seasons—some good and carelessly welcomed as our natural due—others bad yet manfully withstood—others again indifferent and frequently a spur to improved endeavour—we cannot deny our heritage, nor indeed Stevenson's prophetic delight in it: but wisdom suggested that we should eschew unprofitable comparisons to the disadvantage of others: if not better, our neighbours and their lands, were as good as we and ours.

When, however, Stevenson extolled the natural fertility of the land of his adoption and exulted in its generous response, he stood perhaps on sounder ground, at all events to the extent of that portion of the colony at the time known to him: nor could he be expected to know at that time that about two-thirds of the arable land of South Australia was mallee land!([8]) I have already expressed bewilderment at the magnitude of the anticipatory mean grain yields per acre of the greater part of this first decade coupled with discreet silence as to yields *actually realised*: but in this instance Stevenson professed to speak of accurately measured returns secured on city property and in a year of relatively low rainfall: nor was there any apparent reason why his sincerity in the matter should be doubted: but should we not rather ask ourselves whether *mean yields per acre* calculated from the returns of small garden plots, infinitesimal fractions of an acre, could be any other than "a snare and a delusion," when brought into relationship with the business of growing crops on the broad acres of a workaday farm? To argue, for instance, that because Gardener "Stevenson" had succeeded in reaping 0.53 bushels of wheat from one-hundredth part of an acre (0.01 acres)—which a simple calculation would show to correspond to 53 bushels per acre—it followed that Farmer "Allen" should be able to do likewise on one hundred acres of his own land, was clearly illogical, and founded on faulty premises: it implied ignorance of the fact that the aims and methods of the twain were as the poles apart. On his one-hundredth part of an acre Gardener "Stevenson" would have practised "spade husbandry" with all the meticulous care that such husbandry usually implied: and moreover, in the matter of wheat, so essentially an unusual garden crop, his aims would have been "popular effect" but not a "livelihood." In the circumstances, however great the abilities and technical skill of Farmer "Allen," who practised "horse and plough husbandry" and whose aims were above all a "livelihood"—earned, it is true, according to art—it was certain that in the same season and on similar land, his 10,000 one-hundredth parts of an acre could not be made to average out at 0.53 bushels each: indeed it was highly improbable that any one of them would do so, or anything approaching it.

There remained also for consideration whether after all *this one-hundredth part of an acre* did actually produce wheat at the calculated rate of 53 bushels

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([8]) Journal of the Department of Agriculture of South Australia, volume 37, page 630: Natural and Federal Disabilities of South Australia viewed as an essentially agrarian State by A. J. Perkins.

to the acre, as Gardener "Stevenson" in all good faith asserted that it did. Such a calculated yield would be based upon two measurements—the area upon which the wheat had been grown, and the weight of clean grain obtained therefrom—neither of which measurements can ever be guaranteed absolutely correct. And since Gardener "Stevenson" and his like would be aiming at "effect," and not at a "livelihood," his or their unconscious bias would lead quite honestly to a slight under-statement of the area and a slight over-statement of the produce: and when subsequently these two misstatements were converted into bushels per acre, the original experimental errors would be magnified respectively one hundred fold: and the smaller the area the greater the distortion of facts induced thereby. In the instance before us, if the "*true*" area under wheat were one-thousandth part of an acre greater than Gardener "Stevenson" had been led to believe—that is to say, 0.011 acres instead of 0.010 acres—and if the "*true*" quantity of grain reaped therefrom were one-thousandth part of a bushel less than the same authority had assumed it to be—that is to say, 0.529 bushels instead of 0.530 bushels—then, the "*true*" calculated yield per acre of this small garden plot would have been 48 bushels instead of the 53 bushels claimed by Gardener "Stevenson": but on the other hand, if these apparently unconscious errors were more pronounced, and the differences were five-thousandth parts more and five-thousandth parts less respectively, then, the "*true*" calculated yield per acre would fall from 53 bushels to 35 bushels!

These two examples should suffice to illustrate the extent to which small errors in measurement which are practically unavoidable in field work, may lead to complete misrepresentation of facts, when the attempt is made to express in bushels per acre the meagre returns of small fractional parts of an acre: and in the circumstances it is as well to stress the fact that in all field work it is always wiser, as making a closer approach to certainty, to divide rather than to multiply unavoidable experimental errors: or in other words, to avoid working under conditions involving areas of less than one acre, whenever it seemed important that the results should be given as bushels per acre. But apart from this particular aspect of the question, it must not be supposed in any circumstances that because Gardener "Stevenson" had reaped from a small garden plot the equivalent of 48 bushels, or even of only 35 bushels to the acre, that Farmer "Allen" with all his horses, ploughs, harrows, reaping machine, &c., and a livelihood to earn thereby, could *necessarily* reap 35 to 48 bushels from a single acre, let alone 3,500 to 4,800 bushels from 100 acres.

I have been "thus minute in the matter," to borrow George Stevenson's phraseology, because *the dangerous practice of referring to the produce of small fractions of an acre as so many bushels to the acre* was not confined to the year 1839: indeed it seemed to have developed progressively with the unrolling of the years, until in quite modern times it might be said to have achieved its apotheosis in the shape of a doctrine combining numerously replicated small plots and a calculated standard error. The impropriety of discussing such advanced views in the 1836-46 decade was of course quite obvious: but before taking leave of them for possible future consideration, one might be permitted to suggest that the promiscuous pooling of possibly avoidable errors could but lead to reciprocal neutralisation or cancellation, and hence to piebald ultimate findings: it would seem to follow that a premium had been set upon slovenly work, which in its turn could but issue in questionable conclusions. Indeed such a policy would appear to involve a direct negation of the aphorism "that two wrongs could never make one right." It was also unavoidable that the principle of replication when applied to small field plots could but add to existing field errors in proportion to the number of replications, introducing therefore unwanted complications in a situation already sufficiently complicated. It was strange, but nevertheless true, that the mechanical precision of orderly minds proved at times singularly at variance with the dictates of commonsense.

But it must not be supposed that Stevenson, in his character of publicist and public homilist, was allowed to dilate upon South Australian superiority in complacently respectful silence: time and again he had to defend his position against both the enemy without and the enemy within the city gates. In this first address of his, we might recollect he told his audience that a well-intentioned but inexperienced neighbour of his, had written "home" condemning South Australia's soils, and describing them as "hard as bricks," but who, to Stevenson's exultant delight, in the immediately succeeeding season, was astonished to find the soil he had condemned covered with magnificent vegetables. This delusion of Stevenson's well-meaning neighbour was however very far from being an isolated outbreak; but rather was it symptomatic of the pre-settlement malaise of the community, in which notwithstanding the outpourings of the press, and the assurances of those best qualified to advise, there was considerable anxiety as to the possible unsuitability of South Australia for general agricultural operations; and in particular of that portion of it with which early settlers were in immediate contact, namely, the Adelaide plains: nor could it be asserted that this uncertainty had been wholly eradicated from some minds at all events even to the end of the century. "I recollect," said John Morphett towards the end of 1837, "the disconcerted and dismal look which most of the party regarded from the deck of the ship the dried and scorched appearance of the plains, which to their English ideas betokened little short of barrenness."(⁹) Was it possible, one could imagine them saying with their limited experience, that land so sun-baked, so barren in appearance, could ever be made successfully to carry the crops we had been accustomed to raise in the homeland: crops which if this were summer, should now be showing up to best advantage: but if crop-growing was to prove out of the question, where was the herbage for depasturing flocks and herds of which we had heard so much? And not even the sight of rankly growing kangaroo grass throughout the plains in the immediately succeeding winter and spring, could altogether efface the remembrance of these early impressions. It would seem too, that corresponding pessimistic reports must have crossed the oceans and reached the ears of the Colonisation Commissioners in London, since in their second report to Government we find them committing themselves to the following opinion: "South Australia would always be calculated to be a grazing rather than a tillage country." Even level headed John Morphett, with all his experience of south-eastern Mediterranean countries, thought it expedient to be cautious on this subject: "I think," he said, "our colony will be more engaged in wool growing for the first few years than in farming, as the experience gained in the other Australian settlements shows that to be the most prudent plan. In fact in the former undertaking, there is little or no risk: in the latter there is a considerable outlay required, with a good deal of risk."(¹⁰) Light, on the other hand, seemed to have had no doubts or afterthoughts in the matter, and according to Hodder was wont to say to grumblers: "this country will not only produce cereals, but all the products of Spain and Portugal."(¹¹) Nor should we forget that the Colonel's acquaintance with the Iberian Peninsula and its conditions of climate and soil had been long and intimate. But the greatest, although no doubt, unwitting offender, because of the great authority attaching to his name and opinions, was Captain Charles Sturt, discoverer of the Murray and national hero of South Australia.

(⁹) *The History of South Australia,* by Edwin Hodder, volume 1, page 91.
(¹⁰) *The History of South Australia,* by John Stephens, page 50.
(¹¹) *The History of South Australia,* by Edwin Hodder, volume 1, page 92.

"Captain's Sturt's observation" said George Stevenson in the *Register* "in reference to the unproductiveness of the plains around Adelaide has run the gauntlet of the English and the Irish newspapers; and it is probable has satisfied most people at home that Adelaide is a City of the Desert." . . . "Captain Sturt's opinion was contradicted at the time it was propounded by several individuals who have probably equal skill in scientific and practical agriculture, and certainly more experience in South Australia than Captain Sturt. But it has happened that the contradiction has either not been reported, or it has been suppressed by those *friends* to truth and to the colony, who nevertheless have circulated in England the original opinion."(12)

J. W. Bull.

[*Plate* 22]

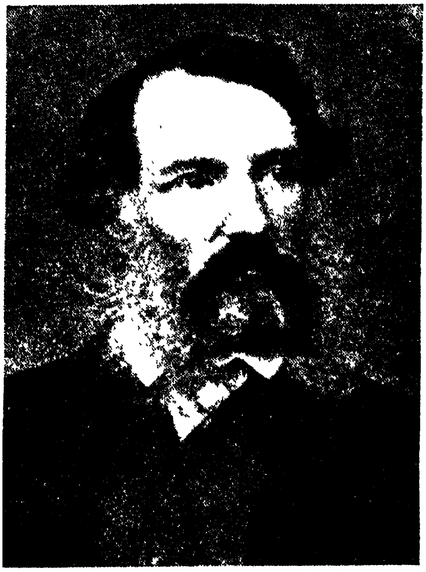
J. W. Bull, in his published reminiscences, confirmed Stevenson's allegations as given above, and claimed to have been present at the meeting at which Sturt's statement was made, in August, 1838, shortly after the latter's arrival in South Australia. In the course of an address on agricultural topics Captain Sturt is reported to have stated: "You, gentlemen, who have taken so long a voyage to form agricultural farms, I caution you, from my own experience of the climate of Australia, after residing in the province of New South Wales, not to attempt to break up land in the western plains or you will meet with sad disappointment. You must not expect to get crops of grain or fruit on this side of the ranges; but I advise you to go to the beautiful hills, valleys and flats between the ranges, and on the eastern slopes; there you will find excellent soil and plenty of good water. If you attempt to cultivate land around Adelaide you will be grievously disappointed." . . . "Captain Sturt, however, was not the only experienced explorer who erred in his opinion of the capabilities of the country, as will appear from the report of Mr. Eyre in his exploring journey north when he discovered the Horseshoe Lake, which he named Lake Torrens, in his flying journey around Mount Deception." . . . "His report published in the papers of the day gave such a deplorable account of the sterility of the country north of Gawler Town, and the want of water that several intending settlers with capital, just arrived at that time, abandoned their intention of setling in South Australia and passed on to Melbourne to our great loss."(13)

Such then were the enemies "within" and "without" whom George Stevenson, the publicist, thought it his duty to combat; and, maybe, on occasion to astonish into acquiescence by the magnificence of his horticultural products. In the interval between his first address—29th September, 1938—and his second address—8th November, 1839—"hot northerly winds and a scorching sun" unexpectedly intervened in the gardens of Adelaide, and the few fields beyond that were under crop in the 1839-40 season. These hot winds, according to

(12) *South Australian Register*, 10th October, 1840, page 2, column 2. See also same newspaper of 15th May, 1841, page 3, column 1; of 22nd May, 1841, page 3, column 2; and of 24th May, 1843, page 2, column 4 (in the latter of which the Reverend T. Q. Stow confirmed the allegations); also Appendix I. at back of volume.

(13) *Early Reminiscences of Colonial Life in South Australia*, by J. W. Bull, 1878, page 55.

Stevenson, had damaged wheat and barley crops that were coming out into ear: but earlier sown crops in which the grain had developed had not suffered at all. He went on to say that he considered the month of April—or at all events not later than May—as the proper seeding time for all hardy cereals, and as certain to ensure them a safe passage "through the dangerous period of bloom." In 1839, crops that had been sown in July—in Stevenson's opinion at least a month too late—had been caught by hot winds just as they were breaking out into bloom, and had suffered to the extent of a probable 50 per cent. of potential yield. He earnestly drew the attention of farmers to these facts, and expressed the hope that in future they would avoid the mistake of sowing their seed too late.



Edward John Eyre

[*Plate* 23.]

Reflections such as these upon "the proper time to sow cereals" in South Australia were of considerable practical interest, inasmuch as they concerned a vital item in the farmer's art, which, although eventually traditional and instinctive, in the beginning of things could be determined only by intelligent observation of climatic variations extending over a long succession of seasons. But by 1839 the opportunity to bring such intelligence effectively into play had not been very great: and it followed that early conclusions on the subject, by Stevenson and others, could not be accepted as anything more than a good working hypothesis, subject to periodical revisal and amendment, as in the course of time more extended local experience tended to accumulate. In the latter connection, however, it should be observed that whatever agricultural experience tended to crystallise out from the mass observation of those early years of settlement, it could concern no more than that portion of South Australia with which settlers had been in consecutive seasonal contact since their landing days, namely, the City of Adelaide and its adjacent plains: subsequently, as in the course of progressive settlement, they spread out in a southerly direction and invaded the adjoining hills, settlers encountered milder and moister climatic conditions, and had to modify their experience accordingly: and later still, when a northerly migration became general, and harsher, hotter and drier climatic conditions were braved, agricultural experience had to be created anew. In the circumstances, from the comfortable vantage-ground of 100 years of experience, whilst admitting the shrewdness and aptness of Stevenson's observations, and the close approximation to reality of his guesses in the matter of "seeding-time," we shall feel competent to question the strict accuracy of his general statement, to the effect that "the proper seeding-time of all hardy cereals was the month of April—or at all events not later than May." It should be added here that the South Australian Royal Almanacks of 1839, 1840 and 1841, all of them published by the proprietors of Stevenson's paper the *South Australian Register*, and with the contents of which he must have been acquainted, recommended sowing wheat in March: such advice would appear to suggest contact with some portions of New South Wales, in which late summer monsoonal downpours were fairly regular, and the winters usually dry, rendering more or less necessary unusually early sowing of the cereals. A somewhat similar experience persisted in some of the most northerly agricultural areas of South Australia, down to the nineties of the last century, when wheat was currently sown as early as February, in an attempt to make late summer rain supplement the deficiencies of winter falls.

It seemed advisable at that stage to summarise briefly the results of our experience of "seeding-time" after 100 years of observation, for the purpose, when required, of contrast between the progressively developing experience of pioneer settlers and that of the present day. If we were to consider this question merely from the standpoint of extreme limits, we should probably agree, that weather conditions permitting, it would be possible in South Australia to sow and to germinate the four usually "winter-sown" cereals, namely, wheat, barley, oats and rye, any time between the 1st April and the 31st July, or thereabouts: but whether at harvest time the crops resulting therefrom would *all* yield profitable returns was quite another question. A period of four months to choose from would seem to offer ample opportunity for all ordinary seeding requirements of the average farmer: and yet strange though it might seem, there was many a season in which not more than one week, or perhaps one fortnight, could be said to offer conditions rendering possible the garnering of maximum crop yields; all crops sown before or after the ideal period suffering reduction in yields proportionate to the distance therefrom of their particular dates of seeding. Much would depend too, upon the special purpose for which the grain might be sown: if early green feed for a dairy herd, for instance, were required, then oats or barley, but preferably barley associated with vetches or pease, should be sown early in April, whilst the soil was still warm, and even if it were in bone-dry condition: and during the course of the month should an inch or so of rain happen to fall, and be followed up by satisfactory May rains, then the dairyman should be able to mow satisfactory supplies of green feed some time in June. Again, if special grazing crops were required for cattle or sheep, oats or wheat, or even rye could be sown some time in April on light tillage, and if seeding rains were normal, then feed should be available by the month of June. Again, if instead of taking one's hay from the headlands and roadways of a wheat field, or from unworthy patches in the latter, one aimed at heavy crops of first-class hay, the latter—whether wheaten or oaten—had better be sown towards the end of April, soil conditions, however, permitting in so far as wheat was concerned.

But for the most part cereal crops were sown for the grain they produced: and if we desired—as we should—maximum yields of grain we should eschew over-early seeding, which usually led to rank growth, lodging of crops, and pinched indifferent grain. For that purpose, other things being satisfactory, experience showed that oats and late wheats could safely be sown towards the end of April, soil conditions again permitting in so far as wheat was concerned. Mid-season wheats on the other hand should be sown in May; early wheats towards the end of May, and beginning of June; and barley in June.

A statement such as the above could make no pretension to finality, or to cast-iron application: much, no doubt, very much depended upon a well-conducted seeding campaign: but seasonal conditions could be such as to upset the best laid plans: one might defer seeding until the arrival of adequate seeding rains, to find when they did come along that the carefully prepared fallows were too saturated to enable seeding operations to proceed: and one was at times driven into sowing in a manner one least desired, but which occasionally turned out to be right after all. The main point seemed to be that the skilful farmer should adapt his seeding operations to current seasonal conditions of the year, however unexpected they might be: and above all that he should waste not a minute in carrying seeding operations to completion. Early settlers seemed to have been obsessed with the idea that extreme summer heat and northerly winds might prove most damaging to their crops: as indeed they might in certain circumstances. "At home," said George Stevenson, "we had to wage war against *cold:* here we have to wage it against heat": and accordingly he counselled *early* sowing in order that the crops when in *blooming* condition might have a better chance of escaping the disastrous effects of hot northerly winds: all unmindful, however, of the fact that plants in bloom that were able to escape northerly winds, would nevertheless have to run the gauntlet of "spring frosts" with their doubtful gifts of empty ears at harvest time. Since Stevenson's time, however, farmers have had ample time to get a better insight into the capriciousness of our seasonal conditions; and these two awkward contingencies—spring frosts on the one hand, and hot northerly winds on the other—they have learnt to treat philosophically; knowing full well that he who sowed wheat early was no more certain of escaping hot winds at bloom time than was he who sowed wheat late to escape spring frosts at the same delicate moment. The whole secret of success in the matter would appear to lie in a proper appreciation of what constituted the *mean* seasonal conditions of the district in which one was placed: and thereafter to make choice of such cereal varieties as were most closely adapted to these conditions: but with a watchful weather eye, nevertheless, upon the special vagaries of the particular season in which seeding operations were taking place.

It should be of interest to take some account of the progress of ideas in the matter of seeding in the first decade subsequent to Stevenson's early pronouncement on the subject. On the 27th March, 1841, the *Register* (probably George Stevenson) remarked that a contemporary had stated that half a bushel of wheat to the acre was sufficient for seed, but that in its (the *Register's*) opinion, such a quantity was too small to ensure a fair crop; three-quarters of a bushel per acre was the least that could be recommended on the best worked soil; and from a bushel to a bushel and a quarter on poor.and newly broken land. *The proper time for sowing wheat throughout the low country around Adelaide was the month of May, and certainly not later than the first week in June: in less forward districts June was early enough.* Above all things farmers were entreated to take care that the smut fungus were killed before sowing.(14)

There was a modern ring in the above paragraph, and very little to cavil at, excepting perhaps the *Register's* ideas as to the necessity of thick sowing on newly broken land which presumably would be free of weeds.

On the 22nd May, 1841, under the caption *"The Barren Plains of Adelaide"* the *Register* remarked that among the splendid samples of wheat produced on these unfortunate plains in 1840-41, it had seen none finer than that submitted by Charles Sprigg. It was said to be a fair sample of his crop and weighed 65lbs. to the bushel: *it was sown on the 13th May,* 1840, on the Adelaide plains, 2½ miles from town, in the direction of Mount Lofty: the grains were uniformly plump, large and floury, and totally devoid of small or uneven ones. The wheat had been uniformly treated with bluestone, which Charles Sprigg had always found to be an infallible preventative of smut, provided that it were applied with all due care. He did not think that one bushel of seed to the acre was a sufficient quantity, and felt confident that his produce would have been greater had he sown a quarter of a bushel more to the acre.(15)

On the 14th April, 1842, the *Register* (probably George Stevenson) stated that barley had been successful wherever sown in the colony: but that oats could not be depended upon unless put in so early as to be past bloom before the full summer heat had set in. In the Mount Barker and upper districts generally, fair average crops of oats had been grown, but it was unlikely that they would be largely cultivated in South Australia, and it believed that we should continue to look to Van Diemen's Land for our chief supplies.(16)

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(14) *South Australian Register,* 27th March, 1841, page 3, column 4.
(15) *South Australian Register,* 8th May, 1841, page 3, column 3.

As to the latter remark it will be sufficient to state that at the time our great South-Eastern districts had not been thrown open for settlement, and that their potentiality for oat growing was not at the time suspected: nor could the *Register* have foreseen that many decades later the necessities of vast areas of mallee land would have compelled settlers on those areas to fall back upon oats in alternation with wheat crops, as the only way to safety, notwithstanding the obvious fact that in the great majority of cases neither soil nor climate were suited to oats.

On the 4th June, 1842, John Reynell, of Reynella Farm, wrote to the *Register* stating that he had put in one or two bushels of wheat per acre according to the nature and condition of the soil, and the period of sowing. He thought it a common error to put in too little seed. The soil being equal in quality and condition, he augmented the quantity of seed one-quarter of a bushel per acre for each month that he was compelled to delay sowing after April.(17)

Here again John Reynell spoke for a district in which average rainfall conditions were exceptionally good: but his practice of "thickening" his seeding as the season progressed was undoubtedly sound, and would still be considered to be so.

In August, 1842, it was debated in Melbourne as to whether "*Australia Felix*" as it was then known—but Victoria as it subsequently became in 1851, not 1835—were better adapted to pastoral than agricultural settlements; and in the course of these discussions the following remarks were attributed to Mr. Foxton: "the soil of Australia Felix not only possessed the property of retaining moisture longer, but when rain did fall, it led more rapidly to healthy development in the crops. But to guard against the evils to be feared from hot winds and long continued drought, he recommended *that wheat should be sown in April, barley in May, and oats in June;* so that those crops might arrive at sufficient maturity by the end of November or beginning of December, when drought and hot winds usually set in.(18)

Very clearly conditions in Australia Felix must have differed radically from those of South Australia: or the variety of oats usually grown in the former country must have been of a very much earlier type than that usually grown in the latter: and conversely for the varieties of barley: or else the powers of agricultural observation had not reached the same degrees of development in the two colonies.

On the 6th May, 1843, a correspondent wrote to the *Register* seeking advice on seeding trouble with which he found himself confronted. The season, it appeared, had opened out badly: the seeding rains—the early rains—had been unduly delayed—in so far as his experience went—to the 5th May there had been none: what was a much tried farmer to do? Would it be safe to sow the seed before the ground had become sufficiently saturated to bring about germination? If soaking rains were held back to the end of the month, or even to the middle of June—actually the rains held off until end of July—would it be better to defer seeding until the seeding rains actually came, or to sow before the rain and abide the consequences? And what was the farmer to do who had already pickled his seed?(19)

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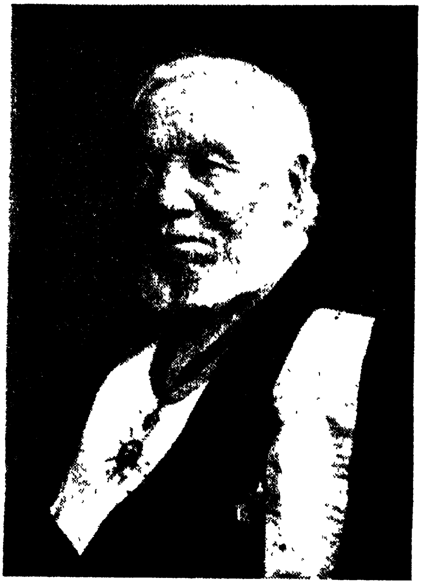
(16) *South Australian Register,* 14th April, 1842, page 3, column 3.
(17) *South Australian Register,* 4th June, 1842, page 3, column 2.
(18) *South Australian Register,* 6th August, 1842, page 2, column 5.
(19) *South Australian Register,* 6th May, 1843, page 3, column 4.

How familiar must such questions sound in the ears of agricultural advisers of the present day? And how little do things seem to have changed since those far gone days?

Even in those early days Stevenson was able to perceive how well adapted to South Australian conditions was the vine: and in his second lecture he drew attention to its great economic importance, and predicted for it a brilliant future in South Australia. After giving a rapid sketch of the most approved methods of culture, he pointed out that at the time more than 60 varieties of vines had been imported into the colony, of which the following were said to be showing to best advantage: **Black Hamburg, Black Cluster, Damascus, Tokay,** Chasselas, Sweetwater, Muscatel, Verdelho, and Muscadine. He recommended planting vines in rows 6ft. apart, and 4ft. in the rows: which distances however eventually proved not great enough in most of the districts of the colony in which vines were planted. He seemed to have been the first advocate of the dangerous practice of "topping" vines, since he recommended pinching back all fruit bearing shoots to within one foot of the highest bunch of grapes.

Stevenson was also very enthusiastic as to the future of the orange in South Australia; asserting that "the time must come when the banks of the Torrens, of the Sturt, and many other of our fine brooks, will boast of orange groves as luxuriant and productive as those of Spain or Italy." According to him the first orange trees imported into South Australia were brought over in May, 1837, by Lieutenant Field, R.M.



Sir Samuel Davenport.

[*Plate* 24]

The olive tree, too, Stevenson recommended both from personal experience in Australia extending over three years, and from earlier acquaintance with Mediterranean countries in which olive trees were largely cultivated: the sunny slopes of our hills should, according to him, prove admirably suited to the requirements of the olive. He believed that in the course of time olive groves would extend from Adelaide to the mountains. Some olive trees had been brought out on the *Buffalo* and despite mismanagement and neglect a few had survived and were developing into fine trees. Stevenson himself had four varieties of olives in his own garden, and John Bailey had as many more in the Botanic Gardens. The economic value of the olive tree was very considerable. It was indeed one of the principal, if not the principal crop of Spain, Italy and Greece: millions of acres of olive trees had been planted in Southern Europe, Northern Africa, and Eastern Asia: there was no "food" fat of higher quality than that produced by the olive tree: and had our people been of Mediterranean extraction, or had we encouraged early Mediterranean settlement as we did early German settlement, Stevenson's anticipatory hopes for the olive might have been realised ere this: but apart from a few honourable exceptions, among whom the names of Samuel Davenport and Thomas Hardy should be associated with that of George Stevenson, we have as a people chronically in a hurry, balked at 10 or 12 years' waiting for the tree to reach profitable fruiting age: and when the few trees we did plant had come into fruit bearing, we balked again at the costliness of picking the fruit! We erred again when we imagined that the olive tree, if nothing else, would make a profit earning breakwind, and for the purpose proceeded to torture a plant of open spaces, a lover of sunlight and air into a neatly clipped hedge. What we should have done from the outset was to recognise in it a suitable basis for a family industry on almost every farm in the colony: the cost of picking the fruit would then have been kept at home. To-day we should have been purveyors of olive oil and pickled olives for the whole of Australasia; and at such a price as to make of them household necessities in every Australian household. In such circumstances there would have been but little need of high tariff protection, nor of the introduction of foreign oil of doubtful quality. It is quite possible that at some future date we might see the wisdom of making some effort to that end.

Thos. Hardy.

[*Plate* 25.]

Stevenson spoke favourably of fig trees, hundreds of which were already to be found in Adelaide gardens: as also of the almond, the pomegranate, the loquat, the quince, the medlar, the plum, the peach, the nectarine, the apricot, the cherry, the pear, the apple, the mulberry, the walnut, the chestnut, and the filbert; all of which were apparently already to be found in the Adelaide gardens; together with the principal vegetables grown throughout Europe.

APPENDIX I.

Sturt's Condemnation of the Adelaide Plains.

Extracts from letter of David Mclaren, Colonial Manager of the South Australian Company, to Edmund Wheeler, London Manager of the same Company under date 28th December, 1839.

The reference was to 1838-39 crop tests on the Company's land.

"The soil is a fair specimen in general of the plains between the city and the hills, excepting the place selected for the maize, which is somewhat better. But the most important circumstance is that the ground on section 256 has only been once ploughed. The season has been favourable. You cannot have a more natural and legitimate topic of congratulation to the shareholders and the friends of the colony generally than the productiveness of the soil even in the neighbourhood of the town. *Captain Sturt had uniformly and decidedly expressed his opinion that agricultural crops could not be successfully reared on the Plains of Adelaide.* I was apprehensive that the return would be very defective. Our experience this season is of the most encouraging kind, and it remains to be seen whether the peculiarity of this season has been so great as to prevent us reasoning in any measure from it. *I do not think so.*

(*To be continued.*)

Cereal and Manurial Experiments in South Australia

[By R. C. Scott, Chief Agricultural Adviser.]

[*Continued from January issue. Page* 509.]

EXPERIMENTS AT URANIA.

(Conducted on the property of Mr. A. W. Kelly.)

Urania is situated in the hundred of Wauraltee toward the centre of Yorke Peninsula, and Mr. Kelly's farm lies immediately to the south-west of the township.

The country is typical of much of the land on the Peninsula, and in its virgin state carried mallee timber of medium size amongst which was a fair quantity of bushy undergrowth.

The soil is of a calcareous nature overlying loose limestone rock, and in normal seasons returns high yields of wheat and malting barley.

The experiments were commenced in 1927, and include trials dealing with the optimum quantity of superphosphate to apply and wheat variety tests.

The nearest rainfall recording station is at Port Victoria, which lies about seven miles to the west, but the registration at this station would approximate fairly closely to that at Urania.

Rainfall at Port Victoria, 1927-35.

Month.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Mean 1927-35.	Mean 57 yrs.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
January	0·18	0·50	0·20	0·00	0·62	0·07	0·45	0·33	0·53	0·31	0·44
February	0 82	1·80	0·45	0·51	0·03	1·80	0·07	0·37	0·07	0·66	0·50
March	0·96	0·35	0·26	0·02	0·58	0·63	0·57	0·45	1·45	0·59	0·67
April	0·18	0·29	0·45	1·05	0·84	2·11	0·66	0·99	0·87	0·82	1·29
May	1·43	1·69	1·41	0·83	2·63	1·42	3·24	0·57	2·25	1·72	2·06
June	0·97	1·93	2·07	0·45	3·11	3·92	0·58	1·33	1·82	1·80	2·28
July	2·14	1·80	1·93	2·98	1·95	2·61	1·51	1·06	1·16	1·90	1·88
August	1·82	0·63	1·86	3·02	2·15	2·15	1·63	2·03	1·05	1·82	1·88
September	0·48	1·02	1·90	1·44	2·23	1·80	2·90	3·15	0·99	1·77	1·59
October	0·04	2·03	0·52	1·56	0 69	3·12	0·56	1·30	2·75	1·40	1·29
November	2·50	0·45	1·09	0·49	0·46	0·26	0·27	1·99	0·56	0·90	0·83
December	0·90	0·15	4·39	1·33	0·24	0·25	0·38	0·02	0·69	0·93	0·67
Totals	12·42	12·64	16·53	13·68	15·53	20·14	12·82	13·59	14·19	14·62	15·38

Useful Rainfall.

Rains.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Mean 1927-35	Mean 57 yrs.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
Seeding	1·61	1·98	1·86	1·88	3·47	3·53	3·90	1·56	3·12	2·55	3·35
Winter	3·11	3·73	4·00	3·43	5·06	6·53	2·09	2·39	2·98	3·70	4·16
Spring	2·34	3·68	4·28	6·02	5·07	7·07	5·09	6·48	4·79	4·98	4·76
Early Summer	2·50	0·45	1·09	0·49	0·46	0·26	0·27	1·99	0·56	0·90	0·83
Totals	9·56	9·84	11·23	11·82	14·06	17·39	11·35	12·42	11·45	12·13	13·10

The above totals show the total and "useful" rainfall recorded during the past 9 years comparatively with the means for 1927-35 and 1879-35.

It will be noted that for the 9 seasons during which the Urania plots have been in progress the total annual rainfall has been about ¾in. below the mean for the district, whilst the "useful" fall is almost an inch below the average. The fall is fairly well distributed throughout the year, the critical period being late spring and early summer. However, at the same time crops are assisted by the relatively mild temperatures which obtain on the Peninsula, and as a rule steady maturity occurs.

Manurial Experiments, Urania, 1927-35.

Year.	No Manure.	½cwt. 45 Grade Super ($11\frac{1}{2}$lbs. P_2O_5).	1cwt. 45 Grade Super (23lbs. P_2O_5).	2cwts. 45 Grade Super (46lbs. P_2O_5).	3cwts. 45 Grade Super (69lbs. P_2O_5).
	B. L.	B. L.	B. L.	B. L.	B. L.
1927	7 56	10 15	10 35	12 20	13 16
1928	4 33	6 29	8 38	9 45	10 45
1929	8 49	11 5	18 50	19 54	22 5
1930	10 19	13 35	15 3	16 18	16 32
1931	25 55	33 25	31 55	35 55	36 2
1932	15 16	16 16	17 27	19 6	19 43
1933	23 55	24 57	27 13	29 52	31 29
1934	10 29	16 30	18 24	20 46	20 41
1935	9 22	15 33	14 56	13 45	16 3
Means, 1927-35 ..	12 57	16 27	18 7	19 45	20 44
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Value at 3s. 4d. per bushel	2 3 2	2 16 6	3 0 5	3 5 10	3 9 1
Net value with Super at 4s. per cwt.	2 3 2	2 14 6	2 16 5	2 17 10	2 17 1

In the majority of years yields have regularly increased with each addition to the amount of superphosphate drilled in with the seed. Consequently the averages show that the maximum grain return has been harvested from the 3cwts. plot, with lower yields as the dressing became lighter. A substantial increase, namely, 3½bush., occurred when the first ½cwt. was added, and in this connection it should be noted that as the plots are situated in different fields from year to year, according to the convenience of the experimenter, the no-manure area would have received dressings of fertiliser in previous years, and the residue from these applications would have some effect on the yield, despite the fact that no superphosphate was sown with the grain in that particular season.

The next ½cwt. added 1bush. 40lbs., whilst the addition of a further 1cwt., that is to say the increase from the 1cwt. to the 2cwts. application, yielded an increase of 1bush. 38lbs., whilst the final dressing of 1cwt. gave less than a bushel additional return. There has been, therefore, a reduction in the increases with the heavier manurial dressings with, as would be expected, the greatest differences following the first and second half-hundredweight dressings. When net value is considered, it can be seen that with wheat valued at 3s. 4d. per bushel 2cwts. of superphosphate is the most profitable dressing, but the cash difference is not great, and with wheat placed at a higher bushel value the 3cwts. would not only show the greatest cash benefit so far as the crop is concerned, but also have an influence on the pasture that follows.

WHEAT VARIETY EXPERIMENTS.

Mr. Kelly is particularly interested in wheat variety experiments, and from time to time has included additional wheats in this test. Consequently it is not possible to show the mean yield of all varieties for the 9-year period, as only

4 have been regularly seeded each season. However, a record of the returns obtained from all wheats included in the trials is shown in the following Table:—

Wheat Varieties, Urania, 1927-35.

	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Mean 1927-35.	Mean 1929-35.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
Nabawa	18 45	11 17	20 6	19 32	34 47	25 51	24 57	21 46	11 26	20 56	22 37
Caliph	18 51	9 45	19 54	16 18	35 55	19 6	29 52	20 46	13 45	20 28	22 14
Sultan	16 59	8 36	21 29	17 30	32 43	20 27	28 44	19 51	13 27	19 58	22 1
Waratah	15 23	10 42	18 31	17 26	31 18	25 23	26 31	21 27	10 44	19 49	21 37
Sword............	—	—	22 52	18 30	33 11	27 10	26 15	21 35	13 20	—	23 16
Nawab	—	—	20 43	17 54	37 2	23 35	26 26	21 20	11 41	—	22 40
Ford	—	—	18 33	17 21	33 20	26 52	27 44	21 2	12 16	—	22 27
Gluford	17 20	11 21	15 56	17 46	32 42	29 18	23 44	16 50	—	—	—
Dan	16 11	11 24	17 59	17 1	30 56	26 1	22 21	—	—	—	—
Daphne	14 52	10 21	19 57	16 32	30 56	22 30	—	—	—	—	—
Begum	—	—	21 31	14 52	33 8	8 51	—	—	—	—	—
S.H.J.	—	—	—	17 47	30 18	31 22	22 29	19 32	—	—	—
Jones Wonder.....	—	—	—	—	34 33	29 27	23 14	15 28	—	—	—
Merridin...........	—	—	—	—	—	—	27 18	19 13	12 50	—	—
Caird	—	—	—	—	—	—	24 27	16 16	—	—	—
Ghurka	—	—	—	—	—	—	—	21 7	14 7	—	—
Ranee 4H	—	—	—	—	—	—	—	21 50	14 57	—	—
Aussie	—	—	—	—	—	—	—	21 54	12 5	—	—
Bencubbin	—	—	—	—	—	—	—	—	14 4	—	—

Of the four wheats tested for 9 years, Nabawa heads the list with a yield of 20bush. 56lbs., but there is not a great deal of difference between any of the returns, all being within the vicinity of 20bush. of grain to the acre. Consequently, Nabawa, Caliph, Sultan, and Waratah may all be regarded as suitable wheats for the district.

By restricting the period to 7 years, 1929-1935, seven varieties may be included in the means. By the exclusion of the 1928 season the averages for all the varieties are increased comparatively with those for the greater number of years. For example, the mean for Nabawa for 1927-35 is 20bush. 56lbs., whilst for 1929-35 it becomes 22bush. 37lbs.

An examination of these averages shows Sword to have given the maximum return with 23bush. 16lbs., but this variety is not much ahead of Ford, which has returned 22bush. 27lbs. per acre. Another wheat that has done well and holds second position is Nawab. The yield of this variety, which is a Roseworthy College crossbred (Anvil x Sultan), is 22bush. 40lbs. per acre.

Gluford, Dan, Daphne, Begum, S.H.J., Jones's Wonder, and Caird have been discarded because they did not compare favourably with the remainder, whilst of the wheats included in recent years, Ranee 4H shows to advantage, and gave the highest yield of all varieties in 1935.

It is interesting to note that the mean yield over the past 7 years for the hundred of Wauraltee is 15bush. 26lbs., whilst that for wheats included in the 7-year mean in this experiment is 22bush. 24lbs., an increase of practically 7bush. It would appear, therefore, that many unsuitable varieties are being planted in this hundred, and if the choice was restricted to the best of those included in this test, the district average would be much improved.

EXPERIMENTS AT SOUTH KILKERRAN.

(Conducted on the property of Mr. O. H. Heinrich.)

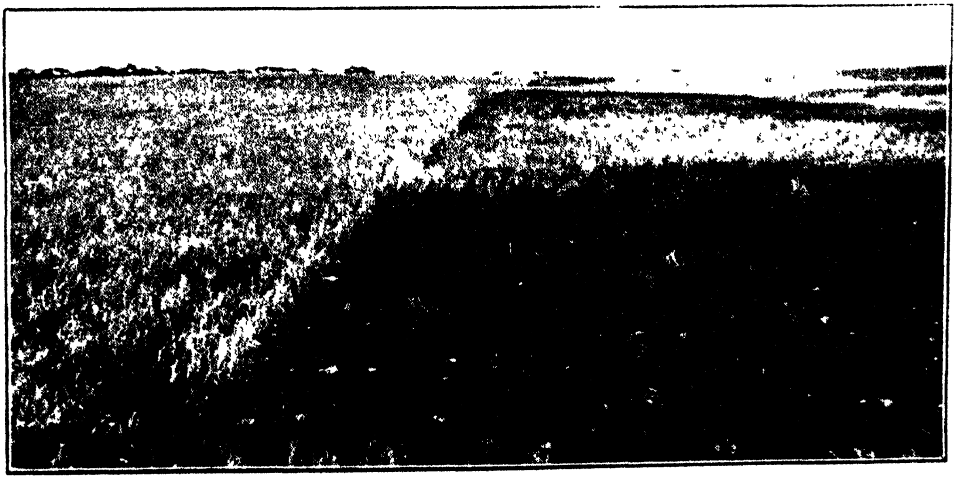
From the result of malting barley variety tests conducted on the property of Mr. O. H. Heinrich in earlier years, it was shown that the two best barleys were Early Challenger and Pryor. The imported Archer and Spratt types were all too late in maturing to be of value in a normal year, and consequently were discarded, and work of selection and building up improved strains of Early Challenger and Pryor commenced. Early Challenger itself is probably a selection from Pryor. It was obtained in the first place from Dookie Agricultural College in Victoria, but the Cerealist at the time (Mr. H. Pye) was unable to give information as to its origin. In habit of growth and appearance of the grain it very closely resembles Pryor, but in the field has consistently yielded slightly better than Pryor. Little has been done in the selection of barley, and it was felt that work of this nature would be useful, for even if no outstanding strain was isolated it would lead to the elimination of the poorer types.

Ears from good plants were selected, and the grain from each sown separately. At harvest time the poorest rows were discarded, and only the best strains continued for future planting. The work has now been in progress for two seasons, and pure lines are being built up for seeding in larger blocks.

EXPERIMENTS AT CORNY POINT.

(Conducted on the property of Mr. A. G. Filmer.)

The experiments at Corny Point are connected with the manganese deficiency of soils on Lower Yorke Peninsula, and the optimum dressing of manganese sulphate for barley crops planted in this area. The earlier work indicating the requirements of such land for dressings of manganese was fully reported upon in 1932 (*Journal of Agriculture*, Vol. XXXV., No. 7). It was clearly shown that in addition to superphosphate, manganese sulphate was essential for full crop returns, but further work was required to prove the most economic quantity to apply. Accordingly, a series of plots dealing with this question were commenced, and there are now 5 years' results to comment upon.



Experimental Plots at Corny Point.

Rainfall at Corny Point, 1931-35.

Month.	1931.	1932.	1933.	1934.	1935.	Mean 1930-35.	Mean 1887-1930.
	In.	In.	In.	In.	In.	In.	In.
January	0·07	0·17	0·31	0·19	0·23	0·19	0·45
February	0·02	1·68	0·09	0·08	0·03	0·38	0·63
March	0·84	0·83	0·24	0·84	1·52	0·85	0·67
April	0·70	2·70	0·72	2·69	1·67	1·70	1·41
May	2·66	1·02	3·76	0·29	1·98	1·94	2·11
June	3·51	4·31	0·84	1·62	2·65	2·59	2·91
July	1·92	2·44	1·60	1·46	2·70	2·02	2·62
August	1·97	2·12	2·95	3·82	1·86	2·54	2·36
September	2·04	1·72	2·00	3·12	1·21	2·02	1·68
October	0·35	1·54	0·83	1·74	2·66	1·42	1·33
November	0·70	0·31	0·24	1·02	0·70	0·59	0·86
December	0·10	0·19	0·32	0·25	0·73	0·32	0·75
Totals	14·88	19·03	13·90	17·12	17·94	16·56	17·78

Useful Rainfall, 1930-35.

Rains.	1931.	1932.	1933.	1934.	1935.	Mean 1930-35.	Mean 1887-1930.
	In.	In.	In.	In.	In.	In.	In.
Seeding, April and May	3·36	3·72	4·48	2·98	3·65	3·64	3·52
Winter, June and July	5·43	6·75	2·44	3·08	5·35	4·61	5·53
Spring, August and October	4·36	5·38	5·78	8·68	5·73	5·99	5·37
Early Summer, November	0·70	0·31	0·24	1·02	0·70	0·59	0·86
Totals	13·85	16·16	12·94	15·76	15·43	14·83	15·28

In years in which the rainfall is above average the disease is usually less severe than in drier seasons. During the 5 years in which the trial has been in progress, rainfall above the average was recorded in 1932 and 1935. Falls approaching the average were received in 1934, whilst 1931 and 1933 were dry years. Therefore, so far as rainfall and the effect of manganese deficiency are concerned, fair average conditions have been experienced during the time in which the trial has been in progress The average rainfall at Corny Point is 17.78in., of which 15.28in. fall during the growing period of the crop. The mean for 1931-35 is 16.56in., or nearly 1¼in. below average, but on the other hand the "Useful" rain approaches 15in., and is therefore quite satisfactory.

MANGANESE SULPHATE EXPERIMENTS.

All plots received a basal dressing of 1cwt. of superphosphate, and were planted with 50lbs. of Pryor barley to the acre. They were each 1 acre in area, and every treatment was replicated four times. The yields secured are set out in the following Table:—

Experiments with Manganese Sulphate on Barley, Corny Point. 1931-35.

Year.	No Manganese.	14lbs. Manganese Sulphate.	28lbs. Manganese Sulphate.	42lbs. Manganese Sulphate.
	B. L.	B. L.	B. L.	B. L.
1931	23 1	33 12	36 40	—
1932	10 44	18 44	21 24	22 48
1933	18 24	24 7	25 44	27 29
1934	15 23	26 44	32 7	31 7
1935	20 44	25 53	28 3	29 41
Mean (4 years, 1932-35)	16 21	24 0	26 45	27 44
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
Value at 2s. 6d. per bushel	2 1 1	3 0 0	3 7 3	3 9 8
Net value with Manganese Sulphate at £16 per ton	2 1 1	2 18 0	3 3 3	3 3 8

A 42lbs. application was not included in the 1931 trials when the dressing was increased from 28lbs. to 56lbs. per acre, the latter giving a mean return of 39bush. 9lbs. per acre for that year.

However, it was considered that the difference in the weight of the dressing —between 28lbs. and 56lbs.—was too great, and a 42lbs. application was included in place of the latter.

There are, therefore, 4 years in which results from 14lbs., 28lbs., and 42lbs. dressings of manganese sulphate have been obtained.

Examination of the above table shows that except in 1934 there has been a regular increase in yield following the additional dressing of manganese. As was anticipated from previous experiments, there was a substantial increase due to the manganese, and comparatively with the superphosphate only plot the superphosphate plus 14lbs. of manganese sulphate gave an additional return of 7bush. 29lbs. per acre. The manganese deficiency does not occur uniformly throughout the paddocks, and as the "No Manganese" plots with 4 replications cover a little more than 4 acres, the crop is always irregular, with some patches a total failure and others, particularly the hollows, fairly good. In addition, there appears to be some residual effect from previous dressings, and as the plots are not always on the same area of land, the "No Manganese" crop may receive some benefit in this way. However, there is no doubt that manganese is necessary, in fact it is generally used by cereal growers in the district, and what is required from this experiment is information concerning the most economic quantity to apply. From this point of view, the means for 4 years show a return of 24bush. of barley for 14lbs. per acre, 26bush. 45lbs. for 28lbs., and 27bush. 44lbs. for 42lbs. of manganese sulphate. Therefore, an addition of 14lbs., that is to say the 28lbs. manganese sulphate dressing, leads to an increased yield of 2bush. 45lbs., whilst the next 14lbs. only gave a further 49lbs. of barley per acre.

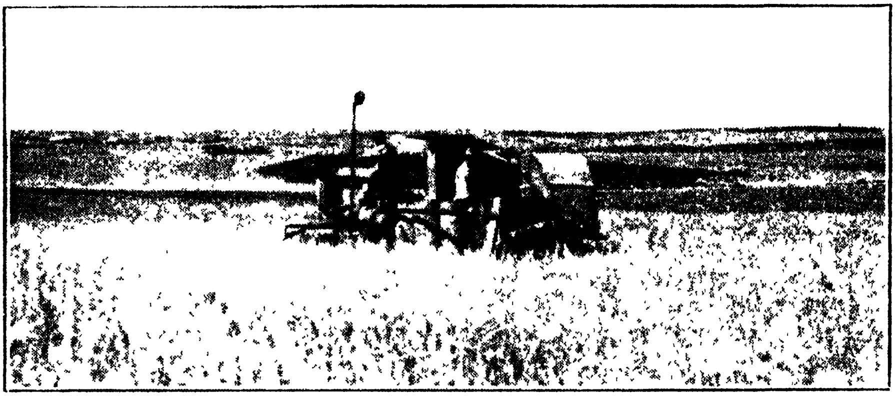
With malting barley valued at 2s. 6d. per bushel, and manganese sulphate at £16 per ton, both these increases are profitable, but the margin in favour of the 42lbs. dressing is so small that probably the most economic application will be somewhere between 28lbs. and 42lbs. In any case, the 28lbs. manuring is distinctly payable, and as the usual dressing in the district at the present time is about 17lbs. per acre (28lbs. manganese with 159lbs. superphosphate = 187lbs. or 1 bag of manure, and this mixture applied at the rate of 1cwt. to the acre), it is certain that it can be increased with advantage. With this application, 95lbs. of superphosphate are added, and accepting this quantity as the optimum phosphatic dressing, the addition of 28lbs. of manganese sulphate would make a total manuring of 123lbs. per acre. If the mixed manure was made up at the rate of 42lbs. manganese sulphate to 145lbs. of superphosphate, that is to say, 42lbs. in a bag, and applied at the rate of approximately 123lbs. per acre, a greater profit than that which follows the customary dressing on the manganese-deficient areas would be received, whilst if barley prices increased, even heavier applications would be payable.

EXPERIMENTS AT UNGARRA.

(Conducted on the property of Messrs. G. and A. Lawrie.)

There are two series of experiments with cereals on Eyre's Peninsula, but at Coorabie, beyond Fowler's Bay, the seasonal conditions have been so severe that no results of value have been obtained. Consequently it is not proposed to report on these.

At Ungarra Messrs. Laurie Bros. have been doing valuable work for the past 9 years, and the results obtained have had an influence on the agriculture of the district. Ungarra is situated about 40 miles north of Port Lincoln, but by rail *via* Cummins the distance is about 70 miles. The soil is a free-working loam of a dark reddish colour, containing appreciable quantities of ironstone, and overlies a good retentive clay subsoil. The country is moderately hilly in nature, and was originally covered with strong-growing mallee timber.



Harvesting Ungarra Experimental Plots.

It is land capable of growing very heavy cereal crops, and yields of over 10 bags of wheat to the acre are frequently harvested.

The rainfall is not heavy, and that experienced in recent years, together with the means for the district, is shown in the following Tables:—

Rainfall at Ungarra, 1927-1935.

Month.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Means 1927-35.	Mean 26 yrs.
January	0·11	0·29	0·14	0·08	0·64	0·23	0·72	0·16	0·74	0·35	0·33
February	1·24	2·73	0·19	1·95	0·00	1·79	0·08	1·04	0·00	1·00	0·66
March	1·15	0·33	0·63	0·00	0·87	0·33	0·37	2·06	1·56	0·81	0·78
April	0·09	0·28	0·31	0·96	0·87	2·73	0·68	3·58	1·27	1·20	0·89
May	2·02	1·09	0·90	0·31	3·12	1·42	3·19	0·06	2·23	1·59	1·90
June	1·59	2·62	2·64	0·45	2·95	3·51	1·36	1·22	2·02	2·04	2·37
July	2·52	1·89	2·26	2·21	3·23	1·96	2·16	1·03	2·56	2·20	2·43
August	3·47	0·83	2·74	3·16	2·12	2·78	2·28	2·66	2·48	2·50	2·29
September	0·47	1·14	2·07	1·72	2·20	3·24	2·53	2·54	1·44	1·93	2·11
October	0·18	1·86	1·10	2·08	0·41	1·08	1·14	1·55	2·82	1·36	1·50
November	1·12	0·17	1·71	0·73	0·80	0·54	1·14	2·05	0·66	0·99	0·94
December	0·34	0·21	1·76	0·33	0·10	0·33	0·21	0·15	0·88	0·48	0·74
Totals	14·30	13·44	16·45	13·98	17·31	19·94	15·86	18·10	18·66	16·45	16·94

Useful Rainfall at Ungarra.

	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Means 1927-35.	Mean 26 yrs.
Seeding, April and May	2·11	1·37	1·21	1·27	3·99	4·15	3·87	3·64	3·50	2·79	2·79
Winter, June and July	4·11	4·51	4·90	2·66	6·18	5·47	3·52	2·25	4·58	4·24	4·80
Spring, August and October	4·12	3·83	5·91	6·96	4·73	7·10	5·95	6·75	6·74	5·79	5·90
Early Summer, Nov.	1·12	0·17	1·71	0·73	0·80	0·54	1·14	2·05	0·66	0·99	0·94
	11·46	9·88	13·73	11·62	15·70	17·26	14·48	14·69	15·48	13·81	14·43

The average rainfall at Ungarra for the past 26 years is 16.94in., whilst for the 9 seasons during which the experiments have been conducted it is 16.45in., a reduction of practically half an inch.

This lesser quantity has been largely brought about by the winter rains being below the mean. During the past 9 years the falls for June and July have totalled 4.24in., whereas the mean fall for these two months is 4.80in. Except for the first two seasons, spring rains have been very satisfactory, and it is these good finishing conditions which lead to the high wheat yields for the district. The total "useful" fall amounts to nearly 14in., and so compares very favourably with many of the better-known wheatgrowing areas on the mainland.

MANURIAL EXPERIMENTS, UNGARRA.

The manurial experimental plots have been sown each year with Gluyas wheat, the area for the respective dressings being 2 acres. They are placed in various fields from year to year, and consequently over a period of 9 years with plots of this size the effect of soil variation is practically eliminated.

The yields obtained from year to year and the means for the full period are shown in the following Table:—

Manurial Experiment, Ungarra, 1927-1935.

Year.	No Manure.	½cwt. 45 Grade Super (11½lbs. P_2O_5).	1cwt. 45 Grade Super (23lbs. P_2O_5).	2cwt. 45 Grade Super (46lbs. P_2O_5).	3cwt. 45 Grade Super (69lbs. P_2O_5).
	B. L.	B. L.	B. L.	B. L.	B. L.
1927	12 18	19 17	21 57	24 42	22 57
1928	15 2	21 23	24 8	27 21	24 38
1929	21 17	28 52	29 46	31 38	31 50
1930	9 48	14 13	15 56	19 4	18 7
1931	25 14	34 34	33 46	33 42	32 46
1932	19 7	22 7	23 13	26 59	24 59
1933	26 49	29 2	29 15	31 45	31 28
1934	22 0	25 2	25 16	30 51	29 40
1935	24 2	22 57	26 10	27 44	27 52
Means 1927-35 ...	19 31	24 10	25 30	28 11	27 9
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
Value at 3s. 4d. per bushel.........	3 5 1	4 0 7	4 5 0	4 15 7	4 10 6
Value with super at 4s. per cwt...	3 5 1	3 18 7	4 1 0	4 7 7	3 18 6

The above results indicate a regular increase in yield up to the 2cwts. dressing, but the addition of a further 1cwt. has not resulted in heavier wheat crops. The response to the ½cwt. of superphosphate manuring has been marked, leading to a gain of almost 5bush. per acre over the average for the "no manure" plot. This additional mean yield is obtained notwithstanding the fact that red rust affected the results in favour of the "no-manure" plot in 1935. The 2cwts. dressing has given the maximum yield with 28bush. 11lbs. per acre, and this is 2bush. 41lbs. better than the 1cwt. plot.

When net returns are calculated, the greatest profit follows the 2cwts. of superphosphate dressing. The value of the crop from this plot is 6s. 7d. per acre greater than that from the 1cwt. plot, 9s. greater than that from the ½cwt. plot, and £1 2s. 6d. greater than that from the "no-manure" plot. These are substantial increases, and as they are the result of 9 years' trials permit a definite recommendation that dressings of superphosphate can with advantage be materially increased in the Ungarra district and on Southern Eyre's Peninsula generally up to a quantity of approximately 2cwts. of 45 grade per acre can be used.

WHEAT VARIETY EXPERIMENTS, UNGARRA.

Quite a number of wheats have been tried at Ungarra from time to time, but only two have been planted regularly throughout the full period. Some have been planted continuously for the past 3 years, and the means for this and the 9-year period, together with a record of the yield for every wheat tested at Ungarra, are shown in the following Table:—

Wheat Varieties, Ungarra, 1927-35.

	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Mean 1927-35.	Mean 1933-35.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B.. L.	B. L.	B. L.
Early Gluyas	24 42	27 21	31 38	19 4	33 42	26 50	31 45	30 51	27 44	28 11	30 7
Ford	19 46	23 50	36 19	17 50	29 47	20 20	33 46	29 40	16 42	25 20	26 43
Ghurka	—	—	—	—	—	—	37 46	26 54	25 3	—	29 54
Waratah	—	—	—	—	—	—	36 51	28 55	20 34	—	28 47
Faun	23 49	25 2	38 9	21 53	32 51	18 38	34 6	28 44	—	—	—
Sultan	23 42	25 4	37 50	18 39	32 29	16 5	—	—	—	—	—
Caliph	21 40	25 46	37 17	18 21	32 29	12 23	—	—	—	—	—
Currawa	19 34	26 58	27 16	20 19	27 8	19 45	—	—	—	—	—
Gallipoli	—	—	39 38	—	33 2	—	—	—	—	—	—
Federation	—	—	36 17	—	27 8	—	—	—	—	—	—
Felix	—	—	—	—	30 25	—	—	—	—	—	—
Wannon	—	—	—	—	28 13	—	—	—	—	—	—
Sword	—	—	—	—	—	—	37 21	—	18 28	—	—
Ranee	—	—	—	—	—	—	—	32 32	20 30	—	—
Nabawa	—	—	—	—	—	—	—	25 54	—	—	—
S.H.J.	—	—	—	—	—	—	—	—	25 51	—	—
Dundee	—	—	—	—	—	—	—	—	14 35	—	—

Early Gluyas has been the best wheat at Ungarra, and has headed the yields on four occasions during the 9-year period. It has shown resistance to red rust that has affected wheat crops in the district in some seasons, and although the plants may carry a fair number of rust spots the grain is not damaged to the same degree as other varieties apparently attacked to a lesser extent.

Early Gluyas has a wonderful average of over 10 bags of wheat to the acre for a 9-year period.

Ford also has done consistently well, and has a mean return approaching 9 bags, whilst other wheats showing promise are Ghurka, Waratah, and Ranee. Wheats like Sultan and Caliph have yielded well in individual years, but have had to be discarded because of their susceptibility to red rust. Faun was not planted in the experimental plots in 1934 but, excluding that year, has an average of 27bush. 54lbs. per acre. Consequently, the proved varieties are Early Gluyas, Ford, and Faun, and these wheats are recommended for general planting in the Ungarra district.

PASTURE EXPERIMENT, UNGARRA.

In 1934 a small field was planted with a mixture of Wimmera rye grass, Dwalganup subterranean clover, and lucerne. The varieties were all seriously damaged by grasshoppers in their first year, but both Wimmera rye grass and lucerne have yielded a good body of feed. The subterranean clover has not persisted satisfactorily, and the encouragement of the natural legumes by adequate dressings of superphosphate appears to be a sounder proposition than spending money in endeavouring to establish this clover in the district.

EXPERIMENTS AT BROWNLOW.

(Conducted on the Farm of Mr. G. H. Biar.)

Manurial and wheat variety experiments were commenced in co-operation with Mr. Biar in 1930, but during the past 6 years the Brownlow district, which is situated about 12 miles south-east of Eudunda and 6 miles south of Sutherlands, has had a particularly trying time. In 1933 and 1934 crops failed to such an extent that the plots were not harvested separately, whilst in the following year the opening rain did not fall until late in July, with the result that the experiment was abandoned for that season. Nevertheless, some useful work has been done, and the yield of wheat in the district would have been much lower had it not been for the planting of drought-resisting varieties, seed of which originated from the experimental plots.

Rainfall at Sutherlands, 1930-35.

	1930.	1931.	1932.	1933.	1934.	1935.	Means 1930-	38 yrs.
	In.	In.	In.	In.	In.	In.	In.	In.
January	0·00	0·37	0·00	1·84	0·46	0·49	0·53	0·38
February	0·40	0·00	1·45	0·00	0·25	0·00	0·35	0·51
March	0·04	0·37	0·88	0·41	0·27	0·95	0·49	0·65
April	0·73	2·02	1·26	0·19	1·44	0·46	1·02	0·62
May	0·41	1·64	1·75	1·35	1·14	0·68	1·00	1·17
June	0·38	1·92	1·43	0·18	0·75	0·48	0·86	1·35
July	2·07	1·17	1·17	0·61	0·87	0·74	1·11	1·00
August	2·57	0·91	2·56	1·75	0·88	0·94	1·60	1·34
September	0·72	1·59	1·36	1·87	1·20	0·70	1·24	1·24
October	2·61	0·35	0·50	0·05	1·60	1·13	1·04	0·99
November	0·48	0·52	0·00	0·83	1·66	0·23	0·62	0·78
December	0·41	0·79	0·48	0·43	0·28	0·31	0·45	0·69
Totals	10·82	11·65	12·84	9·51	9·80	7·11	10·31	10·72

Useful Rainfall.

Rains.	1930.	1931.	1932.	1933.	1934.	1935.	Means 1930-35.	38 yrs.
	In.	In.	In.	In.	In.	In.	In.	In.
Seeding, April and May	1·14	3·66	3·01	1·54	1·58	1·14	2·01	1·79
Winter, June and July	2·45	3·09	2·60	0·79	1·62	1·22	1·96	2·35
Spring, August-October	5·90	2·85	4·42	3·67	3·68	2·77	3·88	3·57
Early Summer, Nov.	0·48	0·52	0·00	0·83	1·66	0·23	0·62	0·78
Totals	9·97	10·12	10·03	6·83	8·54	5·36	8·47	8·49

The above details indicate how difficult the agricultural conditions have been, and show why failures occurred in 1933, 1934, and 1935. However, the mean rainfall for the district since 1897 is only 10.72 8.49 inches fall during the growing period of the crop whilst, in addition, the soil is of a relatively heavy nature, and does not respond to light rainfall as well as land of a more sandy type. Consequently, Brownlow must be regarded as very doubtful wheatgrowing country, although if rains above the average are recorded high wheat yields can be secured.

Seeding the Experimental Plots.

Wheat Varieties at Brownlow.

Variety.	1930.	1931.	1932.
	B. L.	B. L.	B. L.
Nabawa	3 58	13 8	10 29
Bogum	6 37	9 19	10 32
Canberra	3 50	10 17	10 49
Sultan	3 37	9 57	8 58
Federation	3 56	8 53	7 44
Gluyas	5 5	7 30	9 0
Sword	—	9 27	9 42
Gluford	—	8 54	8 34
Waratah	—	—	10 9

Manurial Experiments at Brownlow, 1930-35.

Year.	No Manure.	½cwt. 45 Grade Super (11½lbs. P_2O_5).	1cwt. 45 Grade Super (23lbs. P_2O_5).	1½cwts 45 Grade Super (34½lbs. P_2O_5).	2cwts. 45 Grade Super 46lbs. P_2O_5).
	B. L.	B. L.	B. L.	B. L.	B. L.
1930	4 28	5 19	5 29	4 52	5 27
1931	11 47	12 1	13 8	14 58	14 58
1932	10 18	10 54	10 29	10 53	11 51

With crop failures for the past 3 years there are only yields for 3 seasons to record. The results obtained do not allow comment, but at the same time it can be stated that the introduction of new varieties of wheat into the district has been of advantage, and when tested on other farms on a larger scale the leading varieties in this experiment have proved superior to those previously planted.

EXPERIMENTS AT COPEVILLE.

(Conducted on the Farm of Mr. G. H. Sutherland.)

Copeville is situated in the Murray Mallee, being about 25 miles north of Karoonda on the railway line to Waikerie. The experiments conducted consist of wheat variety trials, rate of manuring tests, and demonstrations with plots of pasture varieties. The soil varies from typical red mallee land to that containing a high proportion of limestone.

The rainfall is relatively low, and in the following Tables the total fall and how it is distributed throughout the year is shown:—

Rainfall at Copeville.

Month.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Means 1929-35.	Means 1912-35.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
January	0·18	0·00	0·42	0·06	2·14	0·55	0·58	0·56	0·44
February	1·61	0·44	0·07	1·88	0·00	0·55	0·04	0·66	0·73
March	0·13	0·03	0·89	0·98	0·87	0·23	0·99	0·59	0·70
April	0·21	0·28	1·30	1·40	0·16	1·41	1·16	0·85	0·54
May	0·88	0·81	1·55	0·78	1·95	0·00	0·70	0·95	1·21
June	1·06	0·60	1·77	2·51	0·18	1·08	1·43	1·23	1·37
July	0·64	1·20	0·71	1·07	0·50	0·63	1·22	0·85	0·94
August	0·59	1·86	1·31	2·44	1·85	1·92	1·50	1·64	1·37
September	1·49	0·84	2·02	1·37	1·42	1·29	1·49	1·42	1·55
October	0·34	2·37	0·62	1·02	0·33	2·30	0·96	1·13	1·13
November	0·94	0·32	0·83	0·04	0·44	1·72	0·44	0·68	0·72
December	2·76	0·55	0·44	0·50	0·47	0·29	0·64	0·81	0·82
Totals	10·83	9·30	11·93	14·05	10·31	11·97	11·15	11·37	11·52

Useful Rainfall.

Rains.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Means 1929-35.	Means 1912-35.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
Seeding	1·09	1·09	2·85	2·18	2·11	1·41	1·86	1·80	1·75
Winter	1·70	1·80	2·48	3·58	0·68	1·71	2·65	2·90	2·31
Spring	2·42	5·07	3·95	4·83	3·60	5·51	3·95	4·19	4 05
Early Summer	0·94	0·32	0·83	0·04	0·44	1·72	0·44	0·68	0·72
Totals ..	6·15	8·28	10·11	10·63	6·83	10 35	8·90	8·76	8·83

The mean fall for the 7 years during which the experiments have been conducted is 11.37in., and is practically equal to the average for the district, namely, 11.52in. 1932 was a year in which the total rain exceeded the mean, whilst 1930 was particularly dry. The "useful" rainfall is only 8.76in., and therefore Copeville must be regarded as a relatively dry area. On the other hand, the class of soil allows crops to make full use of that which does fall.

MANURIAL EXPERIMENTS.

The tests with different quantities of superphosphate were discontinued in 1933, so that there are results of 5 years' work to record.

Manurial Experiments, Copeville, 1929-35.

Year.	No Manure.	½cwt. 45 Grade Super (11½lbs. P_2O_5)	1cwt. 45 Grade Super (23lbs. P_2O_5)	1½cwts. 45 Grade Super (34½lbs. P_2O_5)	2cwts 45 Grade Super (46lbs. P_2O_5)	3cwts. 45 Grade Super (69lbs. P_2O_5)
	B. L.	B. L	B. L.	B. L.	B. L.	B. L.
1929..	1 0	4 53	8 7	7 43	8 3	8 39
1930..........	13 54	20 4	21 37	21 51	22 36	24 17
1931....... ...	6 20	10 59	15 27	17 40	17 33	20 37
1932......... .	17 47	17 15	19 24	19 1	20 43	22 16
1933..	9 1	11 21	12 5	13 51	13 56	12 35
Means, 1929-35	9 36	12 54	15 25	16 1	16 34	17 41
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
Value at 3s 4d. per bushel...	1 12 0	2 3 0	2 11 5	2 13 5	2 15 3	2 18 11
Value with super 4s. per bushel	1 12 0	2 1 0	2 7 5	2 7 5	2 7 3	2 6 11

The averages show a regular increase in yield according to the quantity of superphosphate added. However, once beyond the 1cwt. dressing, these increases are hardly enough to pay for the additional manure used, and when the returns are reduced to a net value it is seen that the 1cwt. and 1½cwts. dressings are equal with £2 7s. 5d. per acre. In this calculation wheat is valued at 3s 4d. per bushel, and consequently any increase in price would improve the position for the heavier application. Therefore, it can be accepted that for wheat crops in the Copeville district at least 1cwt. of 45 per cent. grade superphosphate should be added, whilst if the effect on the feed which follows is taken into consideration, up to 1½cwts. per acre would still be a payable proposition.

Wheat Varieties.

Since 1932 an endeavour has been made to include at least one new wheat in the trials each year, with the result that any comparison over a long period is difficult. In the Copeville district it is essential that a wheat be able to mature its grain under severe finishing conditions, and in the selection of new varieties for trial this fact was borne in mind.

Wheat Varieties, Copeville, 1929-35.

	1929.		1930.		1931.		1932.		1933.		1934.		1935.		Means 1929-35.		Means 1933-35.	
	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
Gallipoli	10	29	17	43	20	18	20	51	12	41	14	5	20	14	16	37	15	40
Gluyas	10	40	21	51	17	40	19	1	13	51	13	40	18	45	16	27	15	25
Canberra	10	27	21	3	22	45	19	1	12	22	12	33	15	32	16	15	13	29
Sword	—		—		17	56	19	34	14	8	12	52	18	13	—		15	4
Ranee	—		—		—		—		12	50	13	3	18	21	—		14	45
Regent	9	54	23	17	18	15	19	55	—		—		—		—		—	
Faun........	8	59	23	16	21	25	20	50	13	41	—		—		—		—	
Sultan	7	46	18	54	18	24	20	0	14	52	—		—		—		—	
Felix	8	18	21	59	17	29	—		—		—		—		—		—	
Gloss........	9	13	20	39	16	59	—		—		—		—		—		—	
Nabawa	—		—		—		19	19	11	29	—		—		—		—	
Waratah	—		—		—		—		11	21	—		—		—		—	
Ghurka......	—		—		—		—		—		14	1	20	50	—		—	
Noongaar ...	—		—		—		—		—		10	5	15	9	—		—	

Gallipoli heads the averages for the 7-year period with 16bush. 37lbs. per acre, closely followed by Gluyas with 16bush. 27lbs. and Canberra 16bush. 15lbs. These varieties all finished well under Copeville conditions, and since the cropping of Gallipoli is being discouraged because of the low quality of the flour produced, whilst the difference in yield is not great, Early Gluyas and Canberra can be recommended for planting in the district. Of the newer wheats, Sword and Ranee have done fairly well with averages of 15bush. 4lbs. and 14bush. 45lbs. respectively, and these varieties can be added to the two already mentioned as suitable for the Murray Mallee area.

OAT VARIETIES.

Not much has been done with oat varieties, but in 1934 Belar and Gidgee were imported from New South Wales, and seeded in comparison with Algerian and Palestine.

Belar did fairly well, and in the 2 years averaged 13bush. 27lbs. of grain per acre, compared with a yield of 12bush. 21lbs. from Algerian.

PASTURE VARIETIES.

In 1931 pasture plots each approximately 1 acre in area were planted. In all, 7 varieties were seeded on fallow ground, and manured with 1½cwts. of 45 per cent. grade superphosphate per acre. The fodders planted were Wimmera rye grass, Perennial rye grass, *Phalaris tuberosa,* Lucerne, Clustered clover, *Danthonia pilosa,* and Creeping saltbush. With the exception of Clustered clover and *Danthonia,* a good germination resulted, and all plants made wonderful growth. However, the following summer was too severe for Perennial rye grass and the *Phalaris,* and both of these failed to persist. The remaining three, namely, Wimmera rye grass, lucerne, and Creeping saltbush, all did well—although the latter was rather thin—and are useful fodders for the district.

EXPERIMENTS AT KEITH.

(Conducted on the Farm of Mr. W. E. Gill.)

The Keith district lies on the fringe of what is described as the Ninety-mile Desert country. The land varies in quality, that in the vicinity of the township being quite good agricultural country, although care is needed to check drift when the land has been regularly cropped. The wheat variety experiments are placed on this better-class soil, whilst work with pastures conducted by another landowner is being carried out on the plain country where the soil is sandy and generally speaking of low fertility. The rainfall at Keith is quite satisfactory for cereal cropping but, of course, the nature of the soil has to be taken into consideration in deciding whether the planting of cereals for grain is likely to prove profitable. On the sandy land they do not thrive in a normal season, and oats for grazing are preferable to attempting to grow wheat. In fact, on this type of country the planting of a cereal would only be carried out in the clearing of the natural bush, yacca, &c., and as soon as possible pastures would be established.

Harvesting the Keith Plots

Rainfall at Keith, 1928-35.

Month.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Mean 1928-35.	29 yrs.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
January	0·50	1·49	0·00	0·72	0·00	0·85	0·35	0·49	0·55	0·42
February	2·28	0·40	0·87	0·13	1·95	0·02	1·08	0·00	0·84	0·92
March	1·14	0·17	0·24	0·96	1·98	0·55	0·47	1·74	0·91	0·80
April	0·81	1·10	1·42	1·18	1·93	1·47	2·08	1·42	1·43	1·15
May	2·83	1·87	1·39	1·99	0·91	4·22	0·00	1·78	1·87	2·28
June	3·30	2·31	0·30	2·83	4·20	0·68	0·47	2·22	2·04	2·19
July	2·02	2·19	3·51	2·85	2·63	1·07	1·12	3·15	2·32	2·12
August	0·67	1·62	2·65	2·67	2·13	2·57	2·81	2·76	2·24	2·18
September	2·00	1·58	2·67	1·98	1·48	2·53	2·29	2·50	2·13	2·24
October	2·96	1·36	2·23	0·34	1·82	0·50	4·63	1·52	1·92	1·54
November.....	0·39	1·09	0·64	0·43	0·63	1·74	2·00	0·82	0·97	1·17
December	0·41	2·02	1·49	0·91	0·60	0·47	1·03	0·32	0·91	0·95
Totals	19·31	17·20	17·41	16·99	20·26	16·67	18·33	18·72	18·13	17·96

Useful Rainfall, Keith, 1928-35.

Rains.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	Mean 1928-35.	29 yrs.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
Seeding, April and May ...	3·64	2·97	2·81	3·17	2·84	5·69	2·08	3·20	3·30	3·43
Winter, June and July ...	6·13	4·18	1·69	4·82	5·11	4·90	0·47	4·00	3·91	4·31
Spring, August October	5·63	4·56	7·55	4·99	5·43	5·60	9·73	6·78	6·28	5·96
Early Summer, November...	0·39	1·09	0·64	0·43	0·63	1·74	2·00	0·82	0·97	1·17
	15·79	12·80	12·69	13·41	14·01	17·93	14·28	14·80	14·46	14·87

The average rainfall is almost 18in., and the "useful" fall nearly 15in. Therefore, the district is well treated with rainfall so far as annual crops are concerned. However, critical periods are experienced in practically every season, particularly late spring or early summer, and in years when rains at these times are up to the average high grain yields are harvested.

WHEAT VARIETIES.

The variety experiments have been in progress for eight years, and the results obtained are shown below:—

Wheat Vareties, Keith, 1928-35.

	1928.		1929.		1930.		1931.		1932.		1933.		1934.		1935.		Mean 1933-35.	
	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
Federation ..	17	53	28	44	7	56	19	2	9	27	26	1	22	28	13	8	20	32
Nabawa	—		—		—		—		—		20	23	25	12	13	0	19	32
Ford	—		—		—		—		—		22	13	20	47	12	48	18	36
Sword	—		—		—		—		—		21	58	15	3	16	33	17	51
Waratah	—		—		—		—		—		20	54	20	35	8	24	16	38
Bena	30	20	29	13	9	2	19	33	15	26	—		—		—		—	
Sultan	24	31	26	36	8	58	22	22	11	43	—		—		—		—	
Dan	20	19	27	27	8	43	14	38	12	42	—		—		—		—	
Major	21	1	26	9	8	14	17	24	9	11	—		—		—		—	
Gallipoli	—		—		13	11	24	22	13	1	27	4	30	11	—		—	
Ranee	—		—		—		—		—		—		24	38	14	39	—	
Ghurka......	—		—		—		—		—		—		—		20	10	—	

Federation has been used as the variety for comparison in these tests, and is the only wheat that has been seeded every year since the commencement.

Over the 8-year period it has averaged 18bush. 5lbs., and heads the list in the means since 1933 with 20bush. 32lbs. per acre. The mean has had to be calculated so that other varieties can be included, and it will be seen that Federation is exactly 1bush. above Nabawa with Ford in third position with 18bush. 36lbs. per acre. In 1932 experiments with several varieties were concluded, and at this stage Bena was at the top of the averages. Consequently it would appear that Federation, Bena, and Nabawa are the most suitable varieties for planting on the better-class land in the Keith district.

Mould Control in Citrus Fruits

Circular issued by the Citrus Preservation Technical Committee, which body is directing a co-operative citrus storage and transport research programme carried out by the Commonwealth Council for Scientific and Industrial Research and the Departments of Agriculture in New South Wales, Victoria, and South Australia.

Towards the close of 1935, a survey of the larger citrus packing houses of New South Wales, Victoria, and South Australia was made as part of the programme of citrus preservation investigations now being carried out by the Council for Scientific and Industrial Research with the co-operation of the various State Departments of Agriculture.

The survey disclosed that methods employed in the handling of the fruit and in the maintenance of shed hygiene do not generally conform with accepted standards, and are directly responsible for wastage losses, not only in export fruit, but also during the comparatively short period in which fruit is held for local market. The purpose of this report is to bring to the notice of the shed management some of the more obvious faults of every day occurrence, together with suggestions for their elimination.

Types of Wastage.

Wastage in citrus fruits marketed locally is chiefly due to green mould (*Penicillium digitatum*) and to a lesser extent to blue mould (*Penicillium italicum*). These moulds are familiar to everyone engaged in the citrus industry and need no description. Blue mould is said to be capable of infecting fruit by contact even if the rind is unbroken, but both blue and green moulds gain access to the fruit usually through wounds. The rind is the normal barrier to infection, and when wounding occurs, as so frequently happens, within the packing shed, the path for infection is provided.

The *Penicillium* moulds are fungal parasites which are disseminated in the atmosphere by means of spores (the equivalent of seeds in the higher plants). The cloud of dust that arises from a mouldy orange when disturbed represents myriads of spores, each one of which is capable of producing wastage if it happens to lodge within the wounded tissue of the rind. The presence of one mouldy orange is sufficient to contaminate the atmosphere of a packing shed. It will, therefore, be obvious that the method of storing mouldy fruit in the bins within the shed, until such time as it is disposed of, is likely to result in all wounded fruits being exposed to heavily contaminated atmospheres.

It will be appreciated that three conditions are necessary before mould wastage can occur—

1. The rind must be injured.
2. Mould must be present in the form of spores in the atmosphere.
3. Conditions of storage must be suitable for the development of the rot.

If any of these factors could be entirely eliminated, mould wastage would be reduced to a minimum. The reduction of all three factors to a minimum should be attempted and it is proposed to show in turn just what is the present status of the industry in regard to each and what precautions may be adopted to ensure that wastage may be kept within reasonable limits in the future.

When fruit is exported overseas or held locally in cool storage, wastage is due in part to the *Penicillium* moulds above described and, in addition, to certain non-parasitic injuries to the rind. The latter take the form of sunken or unsunken discoloured areas of unsightly appearance, and frequently become mould-infected when held in store for any length of time. The majority of the blemishes occurring in cool store come within the category of "Storage Spot." There are indications that "Storage Spot" can be controlled at least in part by the suitable adjustment of storage temperature, but since oranges from some districts are more susceptible to the trouble than those from other areas, it follows that the treatment which they receive prior to storage is of importance.

1. Injury to the Rind.

(a) *From Picking to the Packing Shed.*

Care in the handling of citrus fruits has been emphasised on numerous occasions and no doubt many of the suggestions for improvement have been put into practice for longer or shorter periods with varying success. It is essential that all suggestions should be practised all the time if noteworthy results are to be obtained.

Citrus fruits are initially subjected to wounding at picking time. The practice of pulling is usually detrimental to the storage life of the fruit and is frequently responsible for extensive tearing of the rind in the vicinity of the button. At the same time, it is not suggested that this method should be universally condemned, since the main consideration is the length of time for which the fruit is required to be kept. Pulling is a reasonable and economic practice where oranges are to be consumed within a week, but beyond that time, especially when atmospheric conditions are favourable for mould growth, the grower stands to lose far more through mould wastage than the cost incurred by picking with *gloves and clippers.* Where the latter method is employed it is necessary that the gloves should be in good condition and particular care must be taken to avoid injury to the rind by the careless handling of the clippers.

It is important to see that *aprons* are in good order and free of sand, grit, and other foreign matter. The presence of abrasive particles in the picking apron can cause quite an amount of damage which will be augmented by transference with the fruit to the picking boxes.

Investigations into the sources of wounding have shown that with normal care the amount of damage inflicted up to the time the fruit is placed in the picking boxes is comparatively slight. The most important period is from this point until the fruit is delivered at the packing house. This does not mean, however, that handling at the shed is a relatively unimportant matter, as will be subsequently seen.

It is quite essential that the *picking box* be well constructed and free from splinters and protruding nail heads and points. The internal surfaces of the box should be smooth finished to avoid friction with the fruit during transport. If boxes complying with these specifications are in use, it is still more necessary to see that they are maintained in the same condition.

Both the life of the box and its efficiency are affected by the manner in which it is handled and employees should be made acquainted with this aspect of the problem.

The common method of laying out the picking boxes on the ground prior to picking is to be deprecated. The practice invariably introduces soil to the box and its presence more than neutralises the care and expense bestowed upon a well-made picking box. It is not a difficult matter to provide a couple of lengths of 3in. x 2in. timber upon which the packing boxes may be placed. Alternatively, bags may be spread beneath the boxes to prevent the ingress of sand. In U.S.A. it is usual for pickers to be provided with a small whisk broom by means of which the boxes may be brushed clean before picking commences.

A very common source of wounding is that due to overloading of picking boxes. A clear margin of at least one inch should be allowed in every case to prevent bruising and crushing by the overlying boxes. Movement of the fruit in the case should be reduced to an absolute minimum during transport and this may only be done by having regard to the size of the load, efficiency of springing, and the avoidance of rapid travel where the road surface is imperfect. A very effective method of reducing the "rub" type of injury which results from friction between fruit and box is to place a thin layer of woodwool in the box prior to picking. This practice also serves to protect the fruit from gritty particles, small pieces of dead wood, &c., which find their way to the bottom of the case during transport. Normal care should be exercised when loading the fruit on the truck and similarly during unloading at the shed. The use of a tarpaulin is advisable to keep the load steady and the fruit clean.

(*b*) *The Packing Shed.*

The supervision of handling methods up to the time fruit is delivered at the packing house may be thought to devolve upon the grower except where gang pickers are provided by the shed organisation. This is not entirely the case, since the reputation of the shed product depends in large measure upon the history of the fruit in the early handling stages. It is, therefore, incumbent upon the packing house management to ensure both by publicity and personal instruction, that the methods advocated in this report are generally practised.

At the same time, it must be realised that packing house managers are not in a position to offer advice unless operations under their immediate control are above reproach, and this unfortunately is not always the case. The modern citrus packing house should be maintained in as scrupulously clean condition as is any other establishment handling food products for human consumption, and this not for mere outward form as will be seen later. Apart from this aspect, great care should be paid to the individual units of the shed equipment which, if allowed to deteriorate, may easily be the cause of monetary loss many times in excess of the value of the unit.

Probably the most important part of the entire outfit is the *hopper* or feeder, into which the fruit is tipped prior to passing through the plant. The hopper is commonly protected both on the floor and sides to lessen injury. Sponge rubber is frequently used as the protective agent, but since its period of usefulness is not indefinite it is quite common to see unprotected tack heads standing well out from the surface of the covering material. Many instances could be quoted of dangerous imperfections in this unit. The object of this report, however, is not a critcal review of existing conditions, but rather to make constructive suggestions for improvement. Most of the faults observed are not due to negligence on the part of the management, but rather to an incomplete understanding of the very serious danger which they constitute, and once this is fully realised an intelligent application of the ideas outlined herein will result in the elimination of the obvious points of wounding.

It is difficult to avoid the accumulation of sand and dead twigs on the floor of the hopper, since this is transferred with the fruit, and the presence of such material, as is the case with the field box, neutralises the benefits which would otherwise be derived from the padded floor. For this reason it is suggested that the floor of the hopper should consist of a series of parallel steel bars protected by tubular rubber of suitable thickness.

From the hopper the fruit passes in turn through *a soaking tank*, over cleansing brushes, and then through a second tank containing a preservative solution of some type. Quite a number of cleansing agents are in use and the temperature of the solution depends upon local preference. Within reason, the higher the temperature the more efficient is the cleansing effect and immersion of fruit for five minutes at 100° F. must be considered safe under normal conditions. In fact, for maximum efficiency, both with regard to cleansing and sterilisation, a bath temperature of 110°F. can be safely recommended except in the case of very early fruit and fruit processed towards the end of the season, in which case some rind browning may occur. The provision of thermostatic control of the solution temperature is desirable.

The rind of the orange is readily injured by contact with *dry brushes* and it is necessary to see that these are sprayed for at least five minutes before scrubbing is commenced. Injury of this type is not visible to the naked eye, but becomes apparent on the application of dyes to the surface of the fruit.

After leaving the tanks the fruit is drained free of excess moisture and dried either in an air tunnel or by means of *towelling*. The latter method is not satisfactory, partly because the towelling rapidly becomes saturated when it is no longer efficient, and partly on hygienic grounds, since an unlimited supply of towelling would be required if fresh material were to be used frequently.

Wherever the fruit passes along by means of a moving conveyor, *e.g.*, in the air tunnel, there is a tendency for it to rub along the sides of the plant. This effect is magnified by the rotation of rollers. Wounding may be eliminated by frequent inspection and the sandpapering of roughened surfaces or preferably by the provision of a rubber flap on either side along the entire length of the conveyor.

Leaving the dryer the fruit is usually polished, graded and sized. These operations cause but little injury to the fruit if the units are maintained in good order. In some types of sizer the drop into the bins is excessive, a fault which may be detected by the presence of oil stain on the canvas.

A suitable method of joining up the separate units of the shed equipment does not appear to have been, as yet evolved In many cases the junction is fashioned from sheet galvanized iron and while this provides satisfactory service for some time, it tends eventually to lift at the edge and is then responsible for a large amount of wounding.

When oranges are wounded at any point in the plant, a small amount of oily exudate is deposited which accumulates dust. Repetition of the process builds up a series of sharp excresences known as "dirt knobs." These may be removed by scraping with a blunt instrument.

A daily inspection of the shed plant is strongly advocated and may be quickly and effectively carried out by running the hands carefully along the entire route traversed by the fruit. This procedure adds very little to the working cost, but will be the means of saving money for the shed management and for the grower.

The following figures, derived from an investigation into the sources of wounding carried out by the Citrus Preservation Technical Committee in Australia, indicate the extent of wounding in oranges at three points, viz., during picking, during transport to shed, and in passage through the shed plant. Wounds were rendered conspicuous by immersing the fruit in separate solutions of tannin and ferric chloride when even minute abrasions were indicated by a black deposit within the affected area:—

	Clipper Cut.	Chip	Puncture	Scratch.	Rub.	Gash.	Total.	Per Cent. Wounding.
Picking	4	0	2	6	12	0	24	19
Transport	0	5	0	0	37	0	42	34
Shed	0	12	0	9	32	1	54	43
Total	4	17	2	15	81	1	120	96

Case Count, 124.

The fruit was picked with gloves and clippers, which probably accounts for the comparatively low percentage of wounding at picking. The rub type of wound, which consists in the removal of a more or less extensive circular area of superficial rind tissue, is due to friction with a rough surface. It was responsible for more than half of the total wounding recorded, and is of a type that permits rapid infection since the external walls of the oil glands are removed and penetration by the mould organism *via* the glands is much more easily accomplished than through intergland tissue. The fact that only 4 per cent. of the fruit escaped wounding is direct evidence of the necessity for reform in handling methods. That effective consideration can be given to the matter is shown by a subsequent experiment in which one lug box of fruit was treated as before, one was protected with one and a half ounces of woodwool spread evenly on the floor, while the third was similarly treated with two ounces of woodwool. The result is seen in the following tables.

A.—1½oz. Woodwool.

	Clipper Cut.	Chip.	Puncture	Scratch.	Rub.	Total.	Per Cent. Wounding.
Picking	1	0	4	4	6	15	15
Transport	0	6	0	5	17	28	28
Total	1	6	4	9	23	43	43

Case Count, 100.

B.—2oz. Woodwool.

	Clipper Cut.	Chip.	Puncture	Scratch.	Rub.	Total.	Per Cent. Wounding.
Picking	0	0	4	15	4	23	20
Transport	0	4	0	3	19	26	22
Total	0	4	4	18	23	49	43

Case Count, 114.

C.—No Woodwool.

	Clipper Cut.	Chip.	Puncture	Scratch.	Rub.	Total.	Per Cent. Wounding.
Picking	0	0	6	7	2	15	12·5
Transport	0	6	0	0	47	53	45·5
Total	0	6	6	7	49	68	58

Case Count, 116.

The trees from which the fruit was drawn bore a large amount of dead wood, hence the high proportion of scratch at picking. This is a matter for control by the orchardist, and if wounding due to this source be omitted the figures for woodwool (average) and no woodwool are 34.8 per cent. and 58 per cent. respectively. The mere introduction of woodwool reduced wounding by approximately 40 per cent., which represents a very considerable decrease in the number of oranges that would be susceptible to mould.

A subsequent attempt was made to determine wounding due to shed plant both before and after the elimination of obvious points of injury. The test resulted in a net decrease of 33 per cent., making a total decrease of 73 per cent. in the number of fruits wounded.

These figures demonstrate conclusively that wounding in commercial practice is excessive, and are sufficient recommendation in themselves for the need for radical alteration in present handling methods.

The more common sources of mechanical injury to the fruit may be summarised as follows:—

A. *Orchard.*

1. Projecting wires in picking bags.
2. Foreign matter in bags and field boxes.
3. Field boxes of rough wood or with projecting nails.
4. Pulled fruit.
5. Overloading of field boxes.
6. Fruit with excessively long stems.
7. Excessive speed of trucks on rough roads.
8. Care in loading fruit on trucks.
9. Tarpaulin cover during transport.

B. *Packing Shed.*

1. Condition of hopper.
2. Projections of various kinds and at various places in the plant, *e.g.*, dirt knobs, projecting screws and nails.
3. Woodwork with sharp edges and splinters.
4. Sharp edge on conveyor belts.
5. Spinning fruit due to defect in machinery.
6. Unnecessary machinery.
7. Badly neglected sizers.
8. Excessive drop into sizer bins.
9. Excessive bulge on cases.
10. Careless lidding.
11. Broken lids.
12. Box nails dropped into cases of fruit.

2. The Presence of Mould.

(*a*) *General.*

We have discussed in the previous section the innumerable ways in which wounding in citrus fruits can occur and have also pointed out that wounding is a pre-requisite to fungal wastage. For practical purposes it may be assumed that absolutely sound fruit is not generally liable to attack.

The second condition necessary to ensure mould wastage is the presence of the mould. This does not mean that given 100 per cent. incidence of injury in fruits and the presence of mould spores in the atmosphere or surroundings, 100 per cent. mould wastage will be encountered. It indicates rather that all wounded fruits are liable to attack, but the percentage that actually becomes infected depends upon the degree of contamination or number of mould spores present. It is obvious that 50 mould spores could not immediately infect 100 wounds, but on the other hand it must be remembered that infection of a single orange will result in the reproduction within a very short time of sufficient spores to contaminate heavily the atmosphere of the packing shed. The lesson to be drawn is that, even though it is impossible to eliminate the presence of mould entirely, practices designed to reduce it in quantity will surely be followed by a corresponding reduction in the mould wastage experienced.

Many shed managers are under the impression that, if the "sterilising" bath is effective in killing mould spores present on the fruit, no wastage will occur. It must be emphasised, however, that this procedure is almost useless if, after emerging from the bath, the "sterilised" fruit is again exposed to the contaminated atmosphere of the shed. Assuming that the fruit is wounded—and we are reasonably assured of 50 per cent. wounding in any packing shed under present conditions—mould spores again lodge on the surface of the processed fruit and are retained there by the wrap. The fruit is then placed with others in a case and the fungus allowed to develop under the most appropriate conditions of warmth and moisture.

(*b*) *Contamination of the Orchard.*

Since wounding may occur at any time from picking to packing of the fruit, it is necessary at least to attempt to secure a reduction of mould contamination even on the orchard itself. Occasionally mouldy fruits are to be seen hanging on the tree, and more frequently lying on the ground. These should be collected periodically and destroyed either by burning or by tipping into a fly-proof pit.

Gloves and aprons are potent sources of contamination, and it is a common practice to leave a few oranges in the picking apron when it is thrown on one side. Gloves and aprons should be sprayed with a solution of chlorine (10 parts available Cl_2 per million) at the end of the day.

Picking boxes are commonly very heavily contaminated by mould as is evidenced by the green colour which they assume when in use for some time; a brief inspection of the stacked boxes at any shed will reveal their condition. Tanks containing boiling water, in which the cases may be immersed after each delivery, have been provided in a number of sheds. This process, while lethal to mould, may do harm if it loosens the nails by swelling and shrinkage of the timber. A safe and certain remedy is provided by steam sterilisation after the manner of milk cans in the dairy factory. Granted that boxes are in a clean condition when delivered at the orchard, it must be remembered that mould is commonly present on particles of organic matter in the soil, so that the introduction of soil to the box not only results in wounding but serves also to reinfect the box.

(c) *Contamination in the Packing Shed.*

On arrival at the shed the fruit, particularly if required for export, is stacked for a period of *sweating.* During this operation a certain percentage of mould develops and extreme contamination of the packing house results. Sweating should, therefore, never be carried out in the packing shed or its surroundings. If sweating is considered necessary, the fruit should be stored in an isolated shed on the grove, and at its conclusion all mouldy fruit removed before delivery to the packing shed. The sweating shed should be sprayed with chlorine solution before the next lot of fruit is stored. These remarks apply to some extent also to the *ethylene colouring chamber.* The provision of the necessary facilities and supervision, however, demands that this work should be carried out at the central shed. It is advisable in this case to see that the door of the colouring room does not open directly on to the space occupied by the shed plant from which the room should be isolated by a close-fitting partition.

Perhaps the most important consideration is the avoidance of introducing even one single mouldy orange into *the plant* with the remainder of the friut. During its progress each of the units in turn becomes infected and mould losses will be greatly exaggerated.

While some provision is generally made to ensure apparent cleanliness, many shed managers fail to appreciate the necessity for true hygiene, involving strict elimination of infective material from the shed and its surroundings. A glance under the plant, in sundry corners, in sweat boxes, and around the grounds in the vicinity of the shed reveals in many cases the presence of mouldy fruits in various stages of degeneration. In addition, there is often to be seen a pile of boxes containing wasty oranges held until such time as they accumulate in sufficient numbers as to form a suitable load for the dump. It is not practicable to remove each mouldy orange from the shed as it is found, but it is essential that it should be placed in a properly covered bin outside the four walls of the shed. Such waste as accumulates during the day's run should be tipped into a fly-proof pit, or alternatively, destroyed by burning. The practice of throwing waste fruit in an uncovered heap in proximity to an orchard cannot be too strongly condemned.

Having accomplished all that is possible to prevent the introduction of mould spores into the shed, it is still necessary to reduce that which will be present even when all logical precautions are taken. The best method of so doing is to wash the floor and plant nightly with ½ per cent. solution of caustic soda (a number of proprietary preparations are equally effective). The walls of the shed, canvas bins, polishing brushes, &c., which cannot be washed in this way should be well sprayed with solution of chlorine or with ammonical copper carbonate, 12 pints of ammonia (26° Be.), 20 ounces of copper carbonate, and 100galls. of water. The ammonia is first diluted with 2galls. of water. The copper carbonate is made into a paste with water and slowly added to the diluted ammonia. Water is then added to make up 100galls. Office equipment, furniture etc., where such is housed within the shed, should likewise be sprayed nightly with solution of chlorine. The cleansing method here advocated has been thoroughly tested and shown to give a remarkable reduction in atmospheric mould contamination within the shed. It is unfortunate that most of the Australian sheds were con structed before the importance of a very strict hygiene was realised. and hence do not lend themselves by reason of wooden flooring, &c., to the thorough cleansing that is required. It is recommended that, in the future, citrus packing house construction should be modelled upon the lines of modern dairy factory, in order that correct sanitation may be fully accomplished in practice.

To sum up, shed contamination may be reduced below the danger point by (A) avoidance of unnecessary inoculum, (B) sanitation, as follows:—

A. *Avoidance of Unnecessary Contamination*—

1. Clean picking boxes, gloves, aprons, and clippers.
2. Soil contamination.
3. Sweating chamber.
4. Ethylene chamber.
5. Exclusion of mouldy fruits from plant.
6. Disposal of waste fruit.

B. *Reduction of Contamination by Sanitation*—

1. Washing with ½ per cent. caustic soda, or other suitable fungicide.
2. Spraying with solution of chlorine (10 parts available Cl_2 per million).

3. Conditions for Development of Mould.

Assuming injury to the fruit and the presence of mould spores within the wounded tissues, certain conditions yet remain before rotting can commence. Of these the most important is temperature. Humidity is normally an important factor in the germination of fungal spores, but in this case ample moisture is provided by the orange itself. The temperature-time relations for the development of mould in oranges has been investigated by Dr. R. G. Tomkins, of the University of Cambridge, England. At a temperature of 75°F. an infected fruit will become appreciably rotted, *i.e.*, it will develop a soft spot about 1in. in diameter after three days. Reduction of temperature will retard the development of the rot (see table below) and at a temperature of 40°F. the fruit will resist the fungus for approximately 30 days.

Temperature-time relations for the development of rots in oranges—

75°F.	70°F.	65°F.	60°F.	55°F.	50°F.	45°F.	40°F.
3 days	4 days	5 days	6 days	8 days	10 days	16 days	30 days

It will be seen from this table that Valencia oranges marketed during the summer merely require to be wounded in an atmosphere of contamination for wastage to occur on the local market. The figures also explain in part why mould wastage is far more prevalent in late than in early Washington Navels. It is not possible for the shed organisation to control the temperature factor without the provision of cool storage. It has been discussed here merely to show the possibilities that exist in the matter of losses through mould wastage. If due regard is paid to the avoidance of contamination and wounding, the marketing of citrus fruits in Australia may be undertaken with confidence.

* * *

Production of Butter and Cheese.

The production of butter and cheese for December, 1936, was:—Butter, 1,604,411lbs.; cheese, 1,387,098lbs.

The Development of Red Gum Lands

[By L. J. Cook, Experimentalist.]

This article is based on results of work at the Kybybolite Experiment Station, of which the author was Manager from 1920 until his appointment last year as Experimentalist to the Department of Agriculture.

The Virgin Land.

The physical characters of the main soil of these lands consists of cementy loams varying from 8in. to 18in. in depth on the surface over a stiff yellow clay subsoil from 12in. to 24in. deep, which in turn lies over quite a fair quality marl. Ironstone rubble is found in the surface soil, but the bulk of it rests on the surface of the clay subsoil, and is found in a layer varying from 1in. to 6in. in thickness. The soil is poor in mineral substances considered essential both to plants and animals grazing thereon, and chemical analysis has shown unusually low content of phosphoric acid and lime. Organic matter and nitrogen content is also low in the soil, and they have an acid re-action. The clay subsoil is very stiff and allows only slow movement of water through it, consequently soil drainage is not good, and in wet winters the surface soil quickly becomes saturated to the detriment of plant growths.

These lands carried red and white gums interspersed with tea-tree and some bull oak, and were used originally by graziers for 60 to 70 years for the carrying of Merino sheep for wool production. These sheep produced light fleeces of fine quality wool.

Since cultivation work was commenced, certain areas have been reserved as controls, and for the period under observation these virgin pasture plots have produced natural growths, Wallaby Grass being the principal one that has been of value to livestock. Very small growths of other useful plants have been noted on these pastures, but little selective grazing has been available to stock. Practically 60 per cent. of the surface has either been bare or covered by useless unedible plants. The carrying capacity of this virgin land has been 0.88 sheep per acre on small plots and 0.70 sheep per acre per annum on larger fields.

The rainfall for the past 30 years has averaged 21.57in. per annum, with a distribution that gives heaviest falls throughout the winter months, and allows on the average approximately a seven months' growing period for pasture plants. For the immediate past 10 seasons, 1926 to 1935, the period of main pasture work embodied in this report, the annual precipitation has been 20.52in. per annum, 1in. less than the 30-year average. The autumn (April and May) rains have averaged 3.89in. for the whole period and 4.20in. for the last 10 years. The winter (June, July and August) rains have averaged 8.11in. for the 30 years and 7.25in. for the last 10 years. The spring (September and October) rains have averaged 4.51in. and 4.16in. respectively.

It would appear, therefore, that the openings of the seasons have, of recent years, been a little better, the wet winter conditions have been less severe, but the all-important spring conditions have not been quite so good. The following Table shows Monthly Rainfall of recent years, compared with the average for the past 30 seasons.

TABLE I.—*Monthly Rainfall at Kybybolite.*

	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1906-35.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
April	2·10	0·20	1·50	3·12	1·15	1·98	2·32	2·32	2·97	2·12	1·44
May	3·17	2·92	2·24	2·16	1·39	2·54	0·86	4·97	0·08	1·88	2·45
June	1·24	1·63	2·53	3·32	0·34	3·40	3·38	0·93	0·57	2·59	2·65
July	2·71	2·14	2·71	3·08	4·34	2·52	2·46	0·93	1·97	3·45	2·82
August	3·31	4·02	0·90	1·84	3·65	2·32	2·48	2·79	2·13	2·82	2·64
September	1·79	0·91	3·12	1·75	2·95	1·85	1·39	3·65	2·98	2·74	2·65
October	2·27	0·52	4·47	1·50	2·55	0·47	1·58	1·05	3·36	0·74	1·86
November	0·68	2·06	0·99	0·97	0·93	0·38	0·59	3·90	1·87	1·15	1·47
December	0·83	1·31	0·17	1·66	2·94	0·06	0·74	0·79	0·46	0·50	1·08
	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	
	In.	In	In.	In.	In.	In.	In.	In.	In.	In.	In.
January	0·51	1·59	1·35	0·02	1·59	0·02	1·03	0·42	0·82	1·65	0·56
February	1·20	1·74	0·22	1·57	0·10	1·92	0·02	0·19	0·18	0·03	0·93
March	0·96	0·55	0·65	0·06	0·98	2·11	1·12	0·36	2·88	0·26	1·02
Total	20·77	19·59	20·85	21·05	22·91	19·57	17·97	22·30	20·27	19·93	21·57

Cultivation for Crop Production.

For a period of 15 years commencing in 1906, almost all known methods of crop propagation were tested with partial success. The production of cereal crops for grain quickly absorbed the little available nitrogen, and aggravated the physical condition of the soil, resulting in the quick growth and establishment of sorrel on the already slightly acid soil.

Visitors inspecting Oats and Wimmera Rye Grass Strains at Kybybolite Experiment Station.

It was quickly realised that the organic content of the soil would have to be maintained by the use of livestock, and consequently by growing fodder crops to feed back to the land, and fertilising well with both phosphates and lime, good soil improvement and increased fertility and production were obtained on small areas. This, however, was costly and doubtfully economic under the conditions.

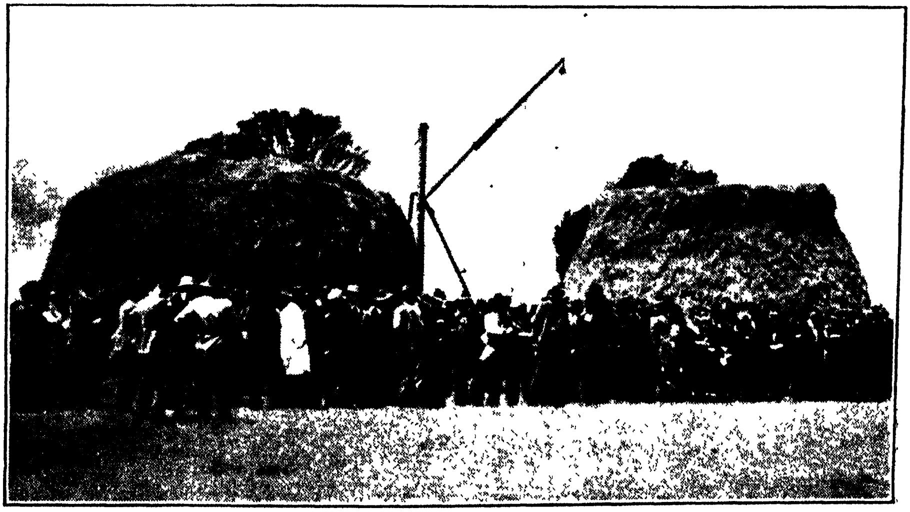
Pasture Development.

The realisation of the value of improving as pasture lands followed with the knowledge of the suitability of Subterranean Clover to the conditions, and its great response to, and utility of phosphatic fertiliser.

Leguminous crops or plants are noted for their soil building qualities, in quickly increasing the nitrogen content of soils. Of the numerous varieties of clovers tried, Subterranean Clover stood out and thrived to perfection on these slightly acid soils without the application of lime. With the exception of a few of the minor naturalised trifoliums, no other clover has shown persistent, healthy, thick growth, and it is apparent that no better agent than Subterranean Clover is needed to build up the nitrogen supply of these soils to maintain healthy grass.

During the past 12 to 15 years, work has been carried out on plots of 3½ acres to 5 acres in area testing the grazing capabilities of this clover under various fertilisings, and its livestock production possibilities, compared with the production obtained by top dressing the natural virgin pasture, without cultivation or sowing of seeds.

By the latter process the partial preservation of the native Wallaby Grass has been obtained. This grass has been saved at a cost of the carrying capacity in the early years of development. Undoubtedly it is a valuable grass for sheep grazing, but it has not given much greater quantity of feed under improvement.



Grass Silage Stacking at Kybybolite Experiment Station Field Day.

When this Wallaby grassland is top dressed with repeated applications of superphosphate, there is at first a great influx and increase in clover growths, creating a large dominance of clover on the land during the second, third and fourth seasons of top dressing. This dominance has been followed by a heavy growth of naturalised annual grasses, and the percentage of clover in the pasture has diminished.

The effect of this on the rooted Wallaby Grass has been to reduce the numbers of its plants per acre, but at the same time to enlarge and invigorate the plants that have survived the competition of annuals, so much so that sheep readily graze the whole of the growth that they make, unlike the Wallaby Grass on the virgin unimproved pasture, which annually produces a lot of dry unedible straw growth.

To illustrate the grazing capacity of this type of improved pasture, the sheep per acre carried each year on Plot P7, which has received an annual application of superphosphate equivalent to 90lbs. 45 per cent. superphosphate (18½lbs. phosphoric acid) since 1924, has been as follows:—

TABLE II.—*Grazing Results of Superphosphate-dressed Natural Pasture.*

Season.	Topdressed Natural Pasture. Sheep per acre.		Virgin Pasture. Sheep per acre.	
1925-26	1·13	1·92	0·76	0·79
1926-27	1·91		0·78	
1927-28	1·79		0·82	
1928-29	2·42		0·62	
1929-30	2·36		0·96	
1930-31	3·02	3·78	1·05	0·93
1931-32	3·79		1·03	
1932-33	3·83		0·99	
1933-34	3·58		0·84	
1934-35	4·81		0·94	
1935-36	3·64		0·74	
	2·93	Average	0·87	

For the first five seasons of development the average carrying capacity was 1.92, whilst for the next and last six seasons the carrying capacity has been 3.78 sheep per acre per annum, approximately double. Where twice the amount of superphosphate has been applied, that is 180lbs. 45 per cent. superphosphate (37lbs. phosphoric acid) per annum (Plot P8), the carrying capacity has been 2.12 sheep per acre per annum the first five seasons, and 4.49 sheep per acre the second five seasons.

For the 10 years 3.30 sheep per acre have been carried, which is a difference of less than half sheep per acre per annum increase, or 2.93 sheep per acre, and indicates that the annual application of 90lbs. 45 per cent. superphosphate per acre is the more economical under these conditions of climate and rainfall.

Effect of Various Soil Amendments and Less Soluble Phosphatic Fertilisers.

Regarding the yield of this type of pasture, secured by the use of other phosphatic fertilisers and soil amendments, the results secured for the past 10 seasons were as follows:—

TABLE III.—*Grazing Results of Natural Pasture Variously Fertilised.*

2 plots (8½ acres)	Lime and Superphosphate, 1 ton Lime every 10 years, 20lbs. Phosphoric acid per annum	3·38 sheep per acre per annum.
1 plot (5 acres) ..	Crushed Limestone and Superphosphate, 1 ton Lime every 10 years, 22lbs. Phosphoric acid per annum	3·28 sheep per acre per annum.
3 plots (10½ acres)	Superphosphate, 22lbs. Phosphoric acid per annum	3·09 sheep per acre per annum.
1 plot (3½ acres)	Gypsum and Superphosphate, 1 ton Gypsum every 10 years, 22lbs. Phospohric acid per annum	2 88 sheep per acre per annum.
1 plot (5 acres) ..	Ephos phosphate, 188lbs. Phosphoric acid in 1924	2·26 sheep per acre per annum.
1 plot (3½ acres)	Crushed Rock Phosphate, 21lbs. Phosphoric acid per annum	2·07 sheep per acre per annum.
1 plot (3½ acres)	Crushed Rock Phosphate, 420lbs. Phosphoric acid every 10 years	2·22 sheep per acre per annum
2 plots (8½ acres)	No Manure (check plots)	0·88 sheep per acre per annum.

These results show conclusively that the most economic phosphatic fertiliser to use on this pasture is superphosphate (water soluble form) applied annually, and that soil amendments such as agricultural lime, or crushed limestone, cause a further slight increase in carrying capacity above the applications of superphosphate.

Compare the results from Plot P7 with those of C4, one that was cultivated and sown down to Subterranean Clover and Wimmera Rye Grass in 1924, and has received 90lbs. 45 per cent. superphosphate (18½lbs. phosphoric acid) annually since. Its grazing figures have been:—

TABLE IV.—*Grazing Results of Superphosphate-dressed Subterranean Clover and Wimmera Rye Grass Pasture.*

Season.	Topdressed Subterranean Clover. Sheep per Acre.		Subterranean Clover, No Manure. Sheep per Acre.	
1925-26	3·12	3·66	2·13	1·67
1926-27	3·72		1·95	
1927-28	3·05		1·94	
1928-29	3·90		1·20	
1929-30	4·52		1·16	
1930-31	4·30	4·91	1·27	1·01
1931-32	4·86		0·88	
1932-33	4·52		1·22	
1933-34	6·48		0·94	
1934-35	5·22		0·83	
1935-36	4·09		0·91	
	4·34 Average		1·31	

For the first five seasons the average was 3.66 and for the next and last six seasons 4.91 sheep per acre per annum. As these plots were established on old cultivated land, an adjustment to allow for residue of phosphate from previous crops, must necessarily be made. Consequently we must deduct the difference in carrying capacity of the control plots in each series. This would then make the average for the first five seasons for Subterranean Clover sown pasture 2.77 as against 1.92 for uncultivated pasture, and for the next six seasons 4.83 for clover pasture against 3.78 for uncultivated pasture.

This difference alone in greater carrying capacity warrants the use of the plough and the destruction of Wallaby Grass. Considering the various fertilisings of this sown pasture of Subterranean Clover and Wimmera Rye Grass, the following table shows the grazing per acre per annum secured over the eight year period 1928-36:—

TABLE V.—*Grazing Results of Subterranean Clover and Wimmera Rye Grass Pasture Variously Fertilised.*

45lbs. 45% super per annum, 9¼lbs. phosphoric acid	3·36	4·48
90lbs. 45% super per annum, 18½lbs. phosphoric acid	4·74	
180lbs. 45% super per annum, 37lbs. phosphoric acid	5·35	
Lime and Super, 23lbs. phosphoric acid annually	5·26	
Gypsum and Super, 23lbs. phosphoric acid annually	4 96	
Basic Slag equivalent, 18½lbs phosphoric acid annually	4·28	
Rock Phosphate equivalent, 37lbs. phosphoric acid annually	3 23	3·14
Rock Phosphate equivalent, 18½lbs. phosphoric acid annually	3·45	
Rock Phosphate equivalent, 9¼lbs. phosphoric acid annually	2·74	
Potash and Rock Phosphate	4·02	
Potash only	2 08	
Control, no manure	1·05	

From these results, if sheep are valued at 15s. each per annum, it will be seen that the heaviest dressing of superphosphate (180lbs.) will return the greatest profit, and that it would be inadvisable to apply less than 90lbs. per acre per annum. With the possible exception of lime, none of the other fertilisers tried are worth consideration. Lime as a soil corrective in conjunction with superphosphate is worth while, provided it can be secured and applied at a reasonable price. The lime dressing adopted on pastures has been applied at the rate of 1 ton per acre every 10 years at approximate cost of £3 per ton applied to the land. The added gain in proportion to cost, however, is small, and further detailed research is needed to show whether the application of lime to these soils creates added improvement in stock development and production above that obtained from the use of phosphatic fertiliser only.

Botanical Analyses of Pastures.

A system of rotational grazing has been observed in depasturing experiments, utilising from 10 to 15 sheep per acre to graze fields weekly in rotation. Grazing once per month has insured comparatively even grazing, and consequent regular growth of pasture plants.

During the last three seasons (1933-35) botanical estimations of the principal growths on the pasture fields have been taken monthly immediately before grazing. It is unfortunate that this work has not been in force from the commencement of pasture fields in 1924, but the readings show facts of interest, particularly regarding the percentage of grass to clover on fields after 10 years' development.

Average Composition for Three Seasons of Pastures Variously Fertilised.

Natural Pasture Plots.

	Rock Phosphate.	Super-phosphate.	Lime Gypsum and Super.	Check No Manure.
	%	%	%	%
Grasses (Naturalised Annuals and Danthonia)	65·64	64·68	64·41	44·10
Clovers (naturalised)	15·00	20·84	15·21	0·36
Erodium	1·40	1·54	5·16	—
Thistles	0·03	0·77	1·33	0·16
Capeweed	0·05	0·47	0·85	0·04
Miscellaneous	9·57	6·59	7·37	26·58
Bare Space	8·31	5·11	5·67	28·76

Subterranean Clover Pasture Plots.

	Rock Phosphate.	Super-phosphate.	Lime and Super.	Check No Manure.
	%	%	%	%
Grasses (Wimmera Rye and Natural Annuals)	32·99	46·71	55·13	15·14
Clovers (Subterranean)	63·18	49·42	36·01	71·67
Erodium	0·07	0·00	—	Trace
Thistles	0·09	0·48	5 13	Trace
Capeweed	0·06	0 42	0·56	0 02
Miscellaneous	0·44	0·82	1·72	1·91
Bare Space	3·17	2·15	1·45	11·26

These results show quite a variation between the two types of pastures, the unsown natural pasture showing a much higher percentage of grass and lower percentage of clover for the three seasons. Miscellaneous plants (useless ones) and bare space are also much higher on this pasture, and also more erodium is appearing. The percentage of naturalised clovers has been low and naturalised grasses (principally barley and silver grasses) have been high, the best percentage of clover being on the plots dressed with superphosphate.

On the sown pasture plots, however, there is quite a different variation, Subterranean Clover being more dominant. A point of particular interest is the greater proportion of grass on the lime and superphosphate dressed pasture compared with that dressed only with superphosphate. This higher number of grasses creates a better winter grazing pasture. The high percentage of clover on the check plot is caused entirely by the residue of phosphate in this soil left from croppings prior to 1922. The clover on this plot makes a lot of cover annually, but very little growth. It is significant that 5 per cent. of thistles have been existent on the lime and superphosphate dressed plot. The amount of bare space and miscellaneous plants has been small on the well fertilised Subterranean Clover, not exceeding 3 per cent. as against 55 per cent. on the unimproved virgin land

The Breeding, Development, and Production of Comeback Sheep on Improved Natural and Sown Subterranean Clover Pastures.

Five years average of lambing percentages 1931-35.

Ewes grazed on Subterranean Clover. Pasture fertilised with Rock Phosphate	87·3%	
Ewes grazed on Subterranean Clover. Pasture fertilised with Superhposphate	83·6%	
Ewes grazed on Subterranean Clover. Pasture fertilised with Lime and Superphosphate	83·5%	
Mean for Clover Pasture		84·8%
Ewes grazed on Natural Pasture. Variously fertilised with Phosphate and Lime		67·4%

Five year average of lamb weights at weaning 1931-1935.

Ewes grazed on Subterranean Clover. Pasture fertilised with Rock Phosphate	57·1lbs.
Ewes grazed on Subterranean Clover. Pasture fertilised with Lime and Superphosphate	53·4lbs.
Ewes grazed on Subterranean Clover. Pasture fertilised with Superphosphate	52·8lbs.
Mean for Clover Pasture	54·4lbs.
Ewes grazed on Natural Pasture variously fertilised	46·3lbs.

These results are from the mating of Merino x English Leicester Comeback ewes with Merino rams, so that the lambs would be seven-eighths Merino blood. The percentages are for actual lambs marked at from six to eight weeks of age and show a decided better fertility from the Subterranean Clover pastures of 17.4 per cent. and stronger lambs from birth to weaning, resulting in 8lbs. heavier lambs at weaning at five months of age. No significant difference is shown by the different fertilisings of Subterranean Clover pasture. There is a small increase of percentage and weight of lamb from rock phosphate fertilising, but this may be accounted by the slightly smaller flock used to graze these plots. Six years' work of checking the live weight of ewes grazing on these two types of pastures are available for five different ages of ewes and the following averages of maximum and minimum live weights show conclusively that a greater development of ewes has been obtained by feeding on the Subterranean Clover pasture.

Average Live Weights of Comeback Ewes, Kybybolite, 1930-36.

	lbs.		lbs.
1929 Ewes, 6 years average.			
Grazed on Natural Pasture variously fertilised			91·9
Grazed on Subterranean Clover fertilised with Superphosphate	111·0	111·6	
Grazed on Subterranean Clover fertilised with Super and Lime	112·6		
Grazed on Subterranean Clover fertilised with Rock Phosphate	111·1		
1930 Ewes, 5 years average.			
Grazed on Natural Pasture variously fertilised			91·4
Grazed on Subterranean Clover fertilised with Superphosphate	108·7	109·2	
Grazed on Subterranean Clover fertilised with Super and Lime	105·5		
Grazed on Subterranean Clover fertilised with Rock Phosphate	113·3		
1931 Ewes, 4 years average.			
Grazed on Natural Pasture variously fertilised			84·9
Grazed on Subterranean Clover fetilised with Superphosphate	101·3	99·2	
Grazed on Subterranean Clover fertilised with Super and Lime	96·3		
Grazed on Subterranean Clover fertilised with Rock Phosphate	100·0		
1932 Ewes, 3 years average.			
Grazed on Natural Pasture variously fertilised			81·3
Grazed on Subterranean Clover fertilised with Superphosphate	104·7	101·7	
Grazed on Subterranean Clover fertilised with Super and Lime	103·1		
Grazed on Subterranean Clover fertilised with Rock Phosphate	97·3		
1933 Ewes, 2 years average.			
Grazed on Natural Pasture variously fertilised			77·4
Grazed on Subterranean Clover fertilised with Superphosphate	82·1	89·3	
Grazed on Subterranean Clover fertilised with Super and Lime	88·7		
Grazed on Subterranean Clover fertilised with Rock Phosphate	97·2		
Means.			
Grazed on Natural Pasture variously fertilised			85·4
Grazed on Subterranean Clover fertilised with Superphosphate	101·6	102·2	
Grazed on Subterranean Clover fertilised with Super and Lime	101·2		
Grazed on Subterranean Clover fertilised with Rock Phosphate	103·8		

Showing 19·6% increase in development on the Clover pasture.

All ewes in the above flocks were of similar breeding, and have been grazed on their respective pastures the whole of their lives, have never been hand-fed at all, and have received no licks or supplementary feed of any kind. It is significant that on the Subterranean Clover pasture in every case the flocks have developed into much heavier ewes than those on natural pasture, showing on the general average of all flocks 16.8lbs. or 19.6 per cent. greater live weight. No significant difference has been obtained between ewes grazed on the variously fertilised Subterranean Clover fields. On 15th January, 1936, the six-year-old ewes that had been consistent breeders throughout their lives were carefully measured for girth circumference, height and withers and length of body from front of withers to root of tail. These measurements verified the greater development of ewes grazed on Subterranean Clover pasture as the following figures illustrate:—

	Girth.	Height.	Length.
Average measurments of ewes grazed on Subterranean Clover Pasture	In. 33·16	In. 24·84	In. 27·15
Average measurements of ewes grazed on Natural Pasture	30·14	23·90	26·64
Difference	3 02 (10%)	0·94 (4%)	0·51 (2%)

Wool Productions.

Weights of wool produced from ewes in the above flocks foi the past six seasons were taken each October immediately after shearing, and illustrates that the better developed ewes have produced the greater quantity of wool, a general increase of 7.4 per cent. on the average. The weights from different aged ewes were as follows:—

	2 tooth Ewes. 5 year av.	4 tooth Ewes. 5 year av.	6 tooth Ewes. 4 year av.	8 tooth Ewes. 3 year av.	Full Mouthed Ewes. 2 year av.
	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
Grazed on Subterranean Clover	8 11	9 5	9 6	9 2	9 2
Grazed on Natural Pasture topdressed	7 13	8 10	8 14	8 12	8 7
Difference	0 14 (11%)	0 11 (8%)	0 8 (5·6%)	0 6 (4·3%)	0 11 (8·1%)

These results show that each age of ewe has on the average produced more wool on Subterranean Clover than on top dressed natural pasture. Two-tooths have given the greatest increase with 11 per cent.; aged ewes, 8.1 per cent.; four-tooth, 8 per cent.; six-tooth, 5.6 per cent.; and eight-tooth, 4.3 per cent. Unfortunately we were unable to have valuations made of the wool from the various flocks, but from valuations made in 1935 by Mr. A. H. Codrington, Instructor in Wool Classing at the School of Mines, of wool from hoggets on natural pasture and Subterranean Clover pasture, only a difference of approximately 3 per cent. was made in favour of the former. He valued these at 14.69d. and 14.32d. Consequently we can assume that the wool from ewes on Subterranean Clover is more valuable per head of sheep than that from ewes on top dressed natural pasture.

9lbs. 2 ozs. @ 14·32d. per lb.	**= 10s. 10d. per head**
7lbs. 8ozs. @ 14·69d. per lb	**= 10s. 4d. per head**

Little difference in wool production has been given by ewes grazed on Subterranean Clover variously fertilised with phosphates. The ewes on clover fertilised with rock phosphates, that have averaged 2lbs. each heavier in live weight, have averaged a little more wool per head than the other two flocks.

Health of Sheep.

The annual loss of ewes for the six seasons has been as follows:—

	%	%
Ewes in Subterranean Clover fertilised with Rock Phosphate	4·00	4·21
Ewes in Subterranea Clover fertilised with Lime and Super	5·00	
Ewes in Subterranean Clover fertilised with Superphosphate	3·70	
Ewes on topdressed natural pasture		1·86

Amongst the three flocks on Subterranean Clover the main losses occurred in 1931 and 1935 when losses were 7.78 per cent. and 5.97 per cent. respectively, whilst the flock on natural pasture had its main losses in 1931 and 1933 with 4.17 per cent. and 3.23 per cent. No definite diagnoses of cases could be obtained, but the principal losses were apparently due to attacks of entero-toxaemia. Generally speaking the flocks have been comparatively healthy throughout the experiment and the losses cannot be looked upon as being abnormal. The greater loss on clover pastures is greatly eclipsed by the larger number of stock carried on the pasture.

The losses of lambs born and reared on the two types of pastures have also been slightly greater on the sown clover pastures.

The average annual loss for three seasons between birth and marking has been 8 per cent. on top dressed natural pasture and 18.6 per cent. on clover pasture, and the average annual loss for six seasons between marking and weaning has been 9.2 per cent. on the former and 2.9 per cent. on the latter. Hence from birth to weaning the loss has been 17.2 per cent. on natural and 21.5 per cent. on clover pasture. Not a very significant difference, but showing to the advantage of clover pasture when it is remembered that the ewes on this pasture marked 17 per cent. more lambs on the average, and the actual percentage of births was considerably higher. The average percentage of actual births of recent years being 100.6 per cent. on clover pasture and 72.8 per cent. on natural pasture.

Finally, by allowing for deaths, not counting lamb grazing, but counting only the actual ewes carried on these plots, the following is the yield of wool per acre per annum produced by the various aged ewes:—

	Sown Clover Pasture		Topdressed Natural Pasture.		Per cent. Increase
	lbs.	ozs.	lbs.	ozs.	%
Ewes bred 1929—6 seasons' average	32	4	23	13	35
Ewes bred 1930—5 seasons' average	34	8	22	15	50
Ewes bred 1931—4 seasons' average	32	8	27	6	19
Ewes bred 1932—3 seasons' average	34	13	27	2	28
Ewse bred 1933—2 seasons' average	34	11	28	8	22

These figures show a fairly consistent difference and an increased production of 32 per cent. in wool per acre due to cultivated clover pasture.

Residual Effect of Superphosphate Fertilising.

To record the residual effect of past applications of superphosphate on clover pasture a test was set out in 1935 on portion of Field No. 18. This field was sown with Subterranean Clover in 1924, and has been maintained as pasture without any cultivation since, and had been top dressed every season except 1931 with superphosphate. Altogether 912lbs. 45 per cent. superphosphate per acre has been applied to the field, or equal to 91lbs. per acre per annum for the 10 seasons.

Four plots each of 3.3 acres were fenced off in 1935 and top dressed with superphosphate as follows:—

R1	45lbs. 45 per cent. Superphosphate per acre.
R2	90lbs. 45 per cent. Superphosphate per acre.
R3	No manure.
R4	180lbs. 45 per cent. Superphosphate per acre.

These plots were grazed consecutively at various periods throughout the winter with varying numbers of the same type of sheep until 6th September. They were then closed from stock and mown for hay on 4th November. Hay was subsequently cured, baled, and weighed out of each plot.

Despite the fact that a really good early season was experienced, a very noticeable difference in amount of growth occurred on Plot **R3** compared with the others within a fortnight of top dressing. The winter grazing was considerably less on this plot, in fact rather more noticeable than could reasonably have been expected, considering that the field had been well fertilised during the previous 10 seasons. However, later in the season the spring growth developed well and the plot yielded a hay cut, not much less than the fertilised plots.

Not much difference was apparent between the three plots fertilised this season, the various quantities of superphosphate, even the light dressing of 45lbs. per acre, making quite an appreciable improvement in the quantity of growths.

The following Table shows the actual sheep per acre carried, averaged over the whole season, the number per acre carried 1st April to 6th September, and the weight of hay cut per acre from each plot:—

	Sheep Per Acre Per Annum.	Sheep Per Acre Winter Period.	Hay Per Acre Harvested.		
			Tons.	Cwt.	Lbs.
R1 45lbs. Superphosphate per acre 1935 ...	2·46	5·67	1	4	44
R2 90lbs. Superphosphate per acre 1935 ...	2·54	5·85	1	10	8
R3 No manure	1·49	3·42	1	3	71
R4 180lbs. Superhposphate per acre 1935 ..	2·52	5·80	1	6	66

The botanical analyses estimations taken on these plots throughout the growing period showed the following percentages on each plot:—

	R1	R2	R3	R4
Clover	66·25	59·00	72·50	59·65
Annual Grass ..	25·25	30·00	16·00	26·20
Capeweed	6·75	9·75	7·75	12·80
Bare Space	1·75	1·25	3·75	1·35

These results show that the plot that received 90lbs. superphosphate per acre yielded the best for the season, the extra hay produced (5cwts. 76lbs. per acre) being worth considerably more than the extra 45lbs. superphosphate applied above, Plot R1.

The yield of hay was somewhat disappointing from Plot R4; that received the most superphosphate (180lbs. per acre), but can be accounted largely by the amount of Capeweed in this plot. This weed was fairly plentiful on all plots, but more so on Plot R4, and as it does not lend itself to making hay, it had the effect of reducing yields.

The experiment, though of only one season's duration, gave sufficient result to indicate that it is necessary to continue applications of superphosphate on this type of pasture to obtain maximum results.

Sown Grasses.

PHALARIS TUBEROSA COMPARED WITH WIMMERA RYE GRASS.

Wimmera Rye Grass has proved itself the most economical grass to grow in conjunction with Subterranean Clover whilst developing these soils. Of others, *Phalaris tuberosa* has proved the only perennial grass that will persist over a comparative number of seasons. Its ability to make good winter growth during cold wet conditions, and its hardiness to withstand our dry summer and autumn periods, combined with its ability to thrive under comparatively poor fertile conditions, make it a very useful grass for those areas.

As a comparison the following Table shows the quantity of grazing and meadow hay secured from the four pairs of plots on the farm sown to *Phalaris tuberosa* and Subterranean Clover, and Wimmera Rye Grass and Subterranean Clover. With these plots each pair has received similar cultivation and fertilising treatment in their histories.

All of these pastures were established on well prepared seedbeds without the use of cover crops of cereals, and the 1934 sowings consisted of 4lbs. grass seed and 3lbs. Subterranean Clover seed per acre in each case.

Sown.	Wimmera Rye Grass and Subterranean Clover.		*Phalaris Tuberosa* and Subterranean Clover.	
	Sheep Per Acre Per Annum.	Hay Per Acre	Sheep Per Acre.	Hay Per Acre.
		Ton. Cwt. Lbs.		Tons. Cwt. Lbs.
1930 on virgin land......	2·89 (6 year average)	1 1 45 (1 year only.)	3·32 (6 year average)	1 1 67 (1 year only.)
1934 on virgin land......	2·54 (2 year average)	—	2·39 (2 year average)	—
1934 on clover land 4 year old	2·92 (2 year average)	—	3·30 (2 year average)	0 19 98 (1 year only.)
1934 on clover land 10 year old	3·39 (2 year average)	2 1 99 (1 year only.)	2·59 (2 year average)	1 9 26 (1 year only.)
Total Hay	—	3 3 32	—	3 10 79
Mean sheep per acre	2·93	—	2·90	—

This Table shows no significant difference between the average carrying capacity of the two pastures, but the botanical analyses made during 1935 shows an advantage to the Wimmera Rye Grass in actual grass production. The amount of Wimmera Rye Grass on the four plots sown with this grass in admixture with clover was 43 per cent. of the total herbage produced, whilst the amount of *Phalaris tuberosa* on its four plots was only 22 per cent. of the total herbage produced. Annual grasses, clover and weeds were more plentiful on the *Phalaris tuberosa* plots.

Work studying the development of sheep and their wool production on these pastures was commenced in May, 1935, in conjunction with the Waite Research Institute.

The Production of Export Fat Lambs.

Of recent years a demonstrative test has been carried out with a view to showing the results of Export Fat Lamb production on the Subterranean Clover pasture, using farm-bred Merino x English Leicester Comeback ewes as mothers and various British-bred sires. Three years' figures are available.

The test was carried out utilising the pasture as the food for the lambs, and consequently lambs were dropped in July so that they would receive grazings when the pastures were at the best growing period.

No hand feeding of supplementary foods was done, so that a comparative true value of the growing pasture from the fat lamb production point of view could be obtained.

All lambs reared were sold to the freezing works and valued on the hooks.

The summary of three years' results show that the average live weight of 534 lambs produced was 73.5lbs. at the farm, and that the dressed weight at Portland was 30.6lbs. or 41.6 per cent. of the farm live weight.

The grading of the carcasses by the purchasers (Messrs. Borthwick Ltd.) were:—60.9 per cent. first quality; 34.5 per cent. second quality; 3.7 per cent. third quality; 0.9 per cent. rejects.

The average monetary value of all lambs for the three seasons was 15s. 6d. each at the Kybybolite Farm, and the grazing production of fields used by the ewes and lambs has been 3.46 sheep per acre per annum for the three seasons.

These results definitely show the suitability of the improved pasture for lamb production, and future work at the station will be to test results from half-bred ewes as mothers, and the supplementary feeding of lambs, with the view to obtaining maximum production results from fat lamb breeding.

Dairying.

These improved lands are definitely proving suitable for dairying. The Ayrshire herd of 40 cows has been bred and maintained principally on the pastures grown on the land. Bran is the only purchased food that has been utilised. This has been fed with crushed oats (produced on the place) as concentrates to the milkers in accordance with their production figures. All young cattle have been maintained on the pastures and hay made from the pastures.

The following Table shows the official production figures of the herd for the five seasons, 1931 to 1936, showing total butterfat produced, average per cow, and value per cow calculated on average Adelaide prices of butterfat:—

Year.	No. of Cows.	Total Butterfat.	Average Butterfat Per Cow.	Price of Buterfat per lb. at Adelaide	Value of Butterfat Per Cow.
		lbs.	lbs.	d.	£ s. d.
1931-32	36	9476·06	263·22	11·86	13 0 1½
1932-33	38	11338·96	298·39	10·02	12 9 1½
1933-34	52	16134·74	310·28	9·5	12 5 7½
1934-35	47	12913·97	274·77	10·11	11 11 6
1935-36	38	10818·57	284·64	11·94	14 3 2½
	211	60682·30	287·59	10·69	12 16 2½

These figures are for all Ayrshires in the herd without handicaps or allowances, and a return of £12 16s. 2½d. per cow for butterfat is satisfactory and shows the suitability of the pastures, and the ensilage and hay made from them, for maintaining profitable dairying.

Summary.

1. The carrying capacity of virgin natural pasture lands has been 0.88 sheep per acre on small plots and 0.70 sheep per acre per annum on larger fields.
2. The annual rainfall for the past 30 years has been 21.57in., whilst that for the immediate past 10 seasons has only been 20.52in.
3. Fifteen years of crop propagation yielded partial success, and showed the necessity for more or less costly fertilisings with both phosphates and lime to maintain soil fertility.
4. The value of improving as pasture lands by the aid of phosphatic fertiliser and cultivation of Subterranean Clover was realised.
5. Results of 12 to 15 years' work comparing grazing capabilities, and livestock production of top dressed natural pasture, and sown Subterranean Clover pasture are given.
6. For 11 seasons natural pasture top dressed with 90lbs. 45 per cent superphosphate annually has carried 2.93 sheep per acre per annum, an increase of 237 per cent. above the control plot.
7. Ten years' results show a slightly greater carrying capacity from natural pasture fertilised with lime as well as superphosphate, but the more remunerative result has been gained by using superphosphate (water soluble phosphate) only.
8. For 11 seasons sown Subterranean clover pasture fertilised with 90lbs. 45 per cent. superphosphate annually has carried 4.34 sheep per acre per annum, which is more than one sheep per acre better than natural pasture similarly fertilised.
9. Eight seasons' grazing results show that an annual dressing of 180lbs. 45 per cent. superphosphate on Subterranean Clover pasture in carrying 5.35 sheep per acre has returned the greatest profit.
10. It is not advisable to apply less than 90lbs. 45 per cent. superphosphate per acre annually to Subterranean Clover pasture.
11. Grazing one week each month with 10 to 15 sheep per acre has given comparatively even growth and regular growth of pasture plants.
12. Three years' botanical analyses show a variation in the mixtures of pasture plants under different fertilisings.
13. A higher percentage of grass to clover, and consequent better winter grazing, has been produced where lime has been applied as well as superphosphate.
14. The amount of bare space and useless plants of pastures have been reduced from 55 per cent. on unimproved virgin land to 3 per cent. on well fertilised Subterranean Clover pasture.
15. The average lambing percentages of Merino x Comeback has been 84.8 per cent. on sown clover and 67.4 per cent. on top dressed natural pasture.
16. The average lamb weights at weaning of Merino x Comeback have been 54.4lbs. on sown clover and 46.3lbs. on top dressed natural pasture.
17. The mean live weight of Comeback ewes developed on sown clover has been 102.2lbs., and similar ewes developed on top dressed natural pasture has been 85.4lbs., 19.6 per cent. less development.
18. Ewes bred and maintained on clover pasture have yielded 7.4 per cent. more wool per head than those bred and maintained on top dressed natural pasture.
19. The annual loss of ewes on clover pasture has been 4.21 per cent., whilst that on top dressed natural pasture has been 1.86 per cent.
20. The annual loss of lambs from birth to weaning, including lambs born dead, has been 21.5 per cent. on clover pasture and 17.2 per cent. on top dressed natural pasture.

21. Sown Subterranean Clover pasture has produced 33lbs. 8ozs. wool, and top dressed natural pasture 25lbs. 4ozs. wool per acre per annum.

22. A one-year experiment definitely indicated that to obtain maximum results, it is necessary to continue annual applications of superphosphate after 10 years of top dressing.

23. *Phalaris tuberosa* has shown approximately equal sheep carrying capacity as that from Wimmera Rye Grass, but does not compete as well against annual grass and weeds.

24. Subterranean Clover pastures are definitely proving suitable for breeding and developing export fat lambs, all lambs returning 15s. 6d. per head average for three seasons at Kybybolite.

25. Officially tested Ayrshire dairy cows have returned an average of £12 16s. 2½d. per head per annum for butterfat.

Chart Indicating the Prices for Export Eggs in Australian Currency.

From time to time—particularly during the egg export season—producers see the prices quoted for Australian eggs on the English market. In every case quotations for Australian eggs are on the basis of a pack of 10doz. eggs.

So that producers can arrive at the approximate net return of the quotations published from overseas, Mr. C. F. Anderson (Chief Poultry Adviser) has supplied the appended chart, which indicates the approximate prices to be expected. The chart has been based on what is termed in the trade as the 15lb. pack, that is the average 2oz. egg with a minimum weight of 1⅞ozs. and a maximum weight of 2⅛ozs., at a commencing price of 6s. 3d. in English currency, to a maximum of 13s. 6d. To give some idea of the extent of the collapse of the English egg market during the 1936 export season, Australian eggs were actually quoted as low as 6s. 3d. per 10doz. pack. This is equal to only 4.375d. per dozen in Australian currency. The average price during the last four or five years has been in the vicinity of 10s. 6d. to 12s. per long hundred for Australian eggs. The 15lb. pack is specially quoted as over 70 per cent. of the overseas exports of South Australian eggs in shell are the 15lb. pack.

EXPORT TO UNITED KINGDOM—EGG PRICES CHART.

Overseas Price per 10doz. 15lb. Pack.	Plus 25 per cent. Exchange per 10doz.	Gross Price per Dozen.	Less 5d. per Dozen for Cases, Fillers, Freight, Insurance, &c., per 10doz.	Net Price per 10doz.	Net Price per Dozen.
English Currency.	Australian Currency.	Australian Currency.	Australian Currency.	Australian Currency.	Australian Currency.
s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
6 3	7 9¾	0 9·375	4 2	3 7¾	0 4·375
7 0	8 9	0 10½	4 2	4 7	0 5½
7 6	9 4½	0 11¼	4 2	5 2½	0 6¼
8 0	10 0	1 0	4 2	5 10	0 7
8 6	10 7½	1 0¾	4 2	6 5½	0 7¾
9 0	11 3	1 1½	4 2	7 1	0 8½
9 6	11 10½	1 2¼	4 2	7 8½	0 9¼
10 0	12 6	1 3	4 2	8 4	0 10
10 6	13 1½	1 3¾	4 2	8 11½	0 10¾
11 0	13 9	1 4½	4 2	9 7	0 11½
11 6	14 4½	1 5¼	4 2	10 2½	1 0¼
12 0	15 0	1 6	4 2	10 10	1 1
12 6	15 7½	1 6¾	4 2	11 5½	1 1¾
13 0	16 3	1 7½	4 2	12 1	1 2½
13 6	16 10½	1 8¼	4 2	12 8½	1 3¼

Does Poultry Keeping Pay at Present Prices

Replying to a question, submitted at the Lower North Agricultural Bureau Conference held at Wasleys in February, whether poultry keeping would pay with the present prices, Mr. C. F. Anderson (Chief Poultry Adviser) stated that this depended on several factors, the principal of which were—(1) cost of foodstuffs, (2) rate of production, and (3) return for eggs.

Cost of Foodstuffs.

At the present prices of the principal foodstuffs, it appeared that wheat as a grain or crushed, was probably the cheapest method of feeding. Then enlarging on the question of feeding, and taking the year 1936 as an example, the following Table showed the average monthly cost as being:—

	Wheat per bush.		Bran per ton.			Pollard per ton.			Yearly Cost.	
	s.	d.	£	s.	d.	£	s.	d.	s.	d.
January	3	8	5	10	0	5	10	0	4	9
February	3	8	5	12	6	5	12	6	4	5
March	3	6	5	7	6	5	7	6	4	5
April	4	1	6	12	0	6	12	0	5	2½
May	4	2	6	14	0	6	14	0	5	5½
June	4	0½	6	19	0	6	19	0	5	3
July	4	3	6	19	0	6	19	0	5	9
August	5	2	6	19	0	6	19	0	6	4
September	5	0½	6	19	0	6	19	0	6	0
October	5	5½	6	19	0	6	19	0	6	6
November	5	4	7	4	6	7	4	6	6	5
December	5	5	7	4	6	7	4	6	6	6

These costs were based on 2ozs. of wheat a day, ½oz. of bran, and 1oz. pollard per day per bird. No allowance was made for the cost of shell grit, meat meal, greenfeed, etc., as these items formed only a small proportion and did not have much influence on the average cost of feeding.

It would be seen from the foregoing Table that, based on the cost for January with wheat at 3s. 8d. per bushel and bran and pollard at £5 10s. per ton, the yearly cost of feeding for those items would be 4s. 9d. February and March showed a slight decline, but from then on it gradually increased until October, when the cost was 6s. 6d. a year on the basis of the feeding for the month of October. November and December showed a little alteration.

Comparing these with the average costs of feeding for previous years, it was found that in 1931-32 the cost was 4s. 2d. per bird, 1932-33 5s. 1d., 1933-34 4s. 6d., and 1934-35 4s. 8d. per bird.

Rate of Production.

Rate of production had always been a debatable question among poultry breeders, but some starting point was necessary in order to arrive at the cost of production, and he believed that with a flock of well-bred stock fed under reasonable conditions, the average should be in the vicinity of 12 dozen eggs a year. That was the basis which had been taken in reply to the inquiry. In order to arrive at the cost of production, this basis must be considered; also the cost of feeding, and for that purpose the following Table showed what the cost was per dozen eggs for food alone, calculated on the 12 dozen average.

FEEDING COST CHART.

Allowing 2oz. Wheat, ½oz. ***Bran,*** 1oz. *Pollard per Day per Bird.*

Wheat Per Bush.	Bran and Pollard Per Ton.	Cost per Bird Per Year.	Cost per Dozen Eggs allowing for 12doz. Average Per Year.
s. d.	£ s. d.	s. d.	d.
4 0	5 0 0	4 9	4¼
4 6	5 10 0	5 4	5⅓
5 0	6 0 0	5 10½	5.875
5 6	6 10 0	6 5	6.416

Return for Eggs.

The return for eggs varied, of necessity, in different localities, but for the purpose of comparison the net price received by eggs from Parafield Poultry Station, had been taken, and these prices were obtained by the average commercial poultrymen. The following figures were taken from the returns for July, 1935, to February, 1937, which were the principal producing months:—July, 1935—11½d., July, 1936—1s. 0½d.; August, 1935—11½d., August, 1936, 1s. 0½d.; September, 1935—11¾d., September 1936—1s. 1½d.; October, 1935—11¾d. October, 1936—1s.; November, 1935—10d., November, 1936—10d.; December, 1935—8d., December, 1936—10d.; January, 1936—8½d., January, 1937—11d.; February, 1936—10d., February, 1937—1s. 1¾d.

From the period, July to the end of February, therefore, egg prices had shown an advance on those for the previous year, even despite the fact that low prices were received from London for November and December shipments. It was pleasing to see, however, that for this year (1937), prices had shown definite advancement from the local trade, indicating quite definitely that the market took a little while to adjust itself to the increased feeding cost. When that happened, it was reasonable to assume that, as had happened in every previous case, poultry farming would be just as profitable, even with foodstuffs up so much higher. As a matter of fact, it was well known among commercial poultrymen that when wheat was previously at 5s. a bushel, and bran and pollard in the vicinity of £7 per ton, the production of eggs was a much more profitable industry than it had been during recent years with cheaper foodstuffs.

Veterinary Inquiries at the Lower North Conference.

[Replies supplied by Mr ALAN H. ROBIN, B.V.Sc., Stock and Brands Department.]

Itch in Horses.

Where facilities for dipping affected animals are not available, good results can be obtained from the following treatment:—

First give the legs, up to knees and hocks (or higher if necessary), a washing with warm water in which has been dissolved a little washing soda. One or two per cent. of any carbolic antiseptic solution (such as Lysol, Milk Oil Fluid, Kerol, &c.) can also be added. This washing must be thorough and an old scrubbing or body brush should be used so that the solution penetrates right down to the skin and the roots of the hair. Then with a soft cloth dry the legs as thoroughly as possible and impregnate the hair and skin lightly with some of the following preparation:—Raw Linseed Oil, 1 pint; Lysol, 2 tblspns. Apply this dressing with a rag mop and repeat the application three or four times at intervals of two to three days. If other parts of body (such as root of tail, mane, &c.) are affected, as well as the legs, the same treatment set out above can be applied to them.

Vaccination of Sheep for Entero-Toxaemia.

Vaccination of sheep as a protection against Entero-Toxaemia is definitely of value, and where a farmer finds his sheep are subject to this disease, is recommended. If "in lamb" ewes are vaccinated so that this procedure is completed about two or three weeks prior to lambing, their lambs will acquire temporary passive immunity which will serve to protect them against the disease until they have attained the age of four to five weeks, when they can be actively immunized by vaccination.

Fertilisers Act, 1918—Analyses of Fertilisers.

Following are results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers during the six months ended 31st December, 1935.

NOTE.—*Deficiencies greater than permitted under section 12 of the Act are shown in bold type.*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble		Acid Soluble		Total					
		Vendor's Guarantee.	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Co., Ltd.—												
2913	Bone Dust	—	—	—	—	40·0	40·5	40	40·5	3·5	3·7	—	—
2934	Bone Dust	—	—	—	—	40·0	42·2	40·0	42·2	3·5	3·9	—	—
2936	Bone and Super.	21·0	23·7	10·0	11·5	12·0	16·2	43·0	51·4	1·6	1·8	—	—
2914	Blood and Bone Special	—	—	—	—	38·0	39·3	38·0	39·3	5·3	5·7	—	—
2915	3 : 1 Super. and Ammonia (No. 2)	34·0	35·3	1·0	1·1	1·0	1·0	36·0	37·4	5·15	5·12	—	—
2935	Top Special Super.	45·0	43·8	—	—	—	—	45·0	43·8	—	—	—	—
	Cresco Fertilizers Ltd.—												
2910	Bone Dust	—	—	—	—	40·0	45·1	40·0	45·1	3·5	3·9	—	—
2932	Bone Dust	—	—	—	—	40·0	43·7	40·0	43·7	3·5	3·6	—	—
3039	Bone and Super.	21·0	25·1	10·0	6·2	12·0	15·3	43·0	46·6	1·6	1·9	—	—
2921	Sulphate of Ammonia	—	—	—	—	—	—	—	—	20·6	20·9	—	—
2919	Super. and Ammonia, 2-1	30·0	33·2	1·0	0·9	1·0	1·1	32·0	35·2	6·87	6·5	—	—
2920	Super. and Ammonia, 6-1	38·0	40·6	1·0	0·5	2·0	1·8	41·0	42·9	2·95	2·95	—	—
2933	45 Super.	45·0	44·1	—	—	—	—	—	—	—	—	—	—
	Heddle, J. A.—												
2924	Bone Manure	—	—	—	—	28·0	31·3	28·0	31·3	4·25	3·75	—	—
	Metropolitan and Export Abattoirs Board—												
2907	Blood Manure	—	—	—	—	—	—	—	—	13·0	12·7	—	—
2926	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·0	—	—
2925	Bone Manure	—	—	—	—	25·0	25·1	25·0	25·1	6·0	6·9	—	—
2908	No. 1 Bone Manure	—	—	—	—	25·0	28·5	25·0	28·5	7·5	7·2	—	—
2909	No. 2 Bone Manure	—	—	—	—	25·0	25·4	25·0	25·4	4·5	6·7	—	—
	Organite Pty., Ltd.—												
2911	Organite	6·5	7·8	—	—	—	—	6·5	7·8	6·0	5·6	—	—
	Wallaroo-Mount Lyell Fertilisers Ltd.—												
2922	Bone Dust	—	—	—	—	40·0	39·1	40·0	39·1	3·5	3·4	—	—
2930	No. 1 Bone Manure M.A.B.	—	—	—	—	25·0	27·9	25·0	27·9	7·5	7·6	—	—
2923	W.M.L. High Grade Super., 45 per cent.	45·0	45·0	—	—	—	—	45·0	45·0	—	—	—	—
2931	W.M.L. High Grade Super., 45 per cent.	45·0	45·0	—	—	—	—	45·0	45·0	—	—	—	—
2903	Muriate of Potash	—	—	—	—	—	—	—	—	—	—	—	—
	Webb, A. J.—												
2906	Carbonate of Lime	—	—	—	—	—	—	—	—	—	—	—	—
	Wingfield Casing Coy., Pty., Ltd.												
2917	Blood Manure	—	—	—	—	—	—	—	—	11·0	11·5	—	—
2929	Blood Manure	—	—	—	—	—	—	—	—	11·0	11·9	—	—
2928	Blood Manure	—	—	—	—	—	—	—	—	12·0	12·8	—	—

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser	Potash in Water Soluble Form.		Calcium Oxide, CaO		Calcium Oxide Expressed as Calcium Sulphate, CaSO4		Bone Manure, Fine Material		Agricultural Lime, Fine Material		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Coy , Ltd —															
2913	Bone Dust	—	—	—	—	—	—	50·0	50·0	—	—	—	—	—	—	9·5
2934	Bone Dust	—	—	—	—	—	—	50·0	49·0	—	—	—	—	—	—	5·52
2936	Bone and Super.	—	—	—	—	—	—	60·0	60·0	—	—	—	—	—	—	6·31
2914	Blood and Bone Special	—	—	—	—	—	—	50·0	50·0	—	—	—	—	—	—	7·55
2915	3 · 1 Super. and Ammonia (No 2)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·34
2935	Top Special Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·72
	Cresco Fertilizers Ltd.—															
2910	Bone Dust	—	—	—	—	—	—	50·0	54·0	—	—	—	—	—	—	11·7
2932	Bone Dust	—	—	—	—	—	—	50·0	69·0	—	—	—	—	—	—	5·18
3039	Bone and Super	—	—	—	—	—	—	60·0	86·6	—	—	—	—	—	—	4·06
2921	Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·1
2919	Super. and Ammonia 2-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·7
2920	Super. and Ammonia 6-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·6
2933	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·17
	Heddle, J. A.—															
2924	Bone Manure	—	—	—	—	—	—	65·0	80·3	—	—	—	—	—	—	5·84
	Metropolitan and Export Abattoirs Board—															
2907	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16·0
2926	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11·3
2925	Bone Manure	—	—	—	—	—	—	60·0	82·1	—	—	—	—	—	—	4·9
2908	No 1 Bone Manure	—	—	—	—	—	—	50·0	55·0	—	—	—	—	—	—	8·15
2909	No 2 Bone Manure	—	—	—	—	—	—	55·0	55·0	—	—	—	—	—	—	8·8
	Organite Pty , Ltd.—															
2911	Organite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16·5
	Wallaroo-Mount Lyell Fertilisers Ltd.—															
2922	Bone Dust	—	—	—	—	—	—	50·0	65·0	—	—	—	—	—	—	7·1
2930	No 1 Bone Manure M A B.	—	—	—	—	—	—	50·0	62·0	—	—	—	—	—	—	6·8
2923	W.M L High Grade Super , 45 per cent	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·9
2931	W M L High Grade Super., 45 per cent.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·51
2903	Muriate of Potash	50·0	51·6	—	—	—	—	—	—	—	—	—	—	—	—	1·08
	Webb, A. J —															
2906	Carbonate of Lime	—	—	47·3	49·8	—	—	—	—	92·0	88·0	—	—	—	—	1·07
	Wingfield Casing Coy Pty., Ltd.—															
2917	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13·9
2929	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·1
2928	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12·9

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble		Acid Soluble.		Total					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Wingfield Casing Coy., Pty., Ltd.—*continued*—												
2916	Bone Manure	—	—	—	—	31·0	33·5	31·0	33·5	4·5	**3·6**	—	—
2927	Bone Manure	—	—	—	—	31·0	36·2	31·0	36·2	4·5	**3·8**	—	—
2918	Ground Oyster Shell	—	—	—	—	—	—	—	—	—	—	—	—
	Wooltana Fertilizers Ltd.—												
2904	Wooltana Fertiliser	1·0	6·2	10·0	8·1	24·0	21·5	35·0	35·8	2·5	**1·8**	—	—
2905	Wooltana "A"	·75	4·9	7·5	5·2	18·0	16·0	26·25	26·1	4·4	4·1	—	—

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO		Calcium Oxide Expressed as Calcium Sulphate. CaSO4.		Bone Manure, Fine Material		Agricultural Lime, Fine Material.		Gypsum. Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Wingfield Casing Coy., Pty., Ltd.—*continued*—															
2916	Bone Manure	—	—	—	—	—	—	50·0	70·4	—	—	—	—	—	—	7·6
2927	Bone Manure	—	—	—	—	—	—	50·0	65·9	—	—	—	—	—	—	7·3
2918	Ground Oyster Shell	—	—	45·0	46·2	—	—	—	—	35·0	40·9	—	—	—	—	3·8
	Wooltana Fertilisers Ltd.—															
2904	Wooltana Fertiliser	0·4	0·4	—	—	—	—	—	—	—	—	—	—	55·0	77·0	10·9
2905	Wooltana "A"	6·6	6·6	—	—	—	—	—	—	—	—	—	—	55·0	83·0	7·7

Following are results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers during the six months ended 30th June, 1936.

NOTE.—*Deficiencies greater than permitted under section 12 of the Act are shown in bold type.*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.		Total.					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Coy., Ltd.—												
2449	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·6	—	—
2448	Bone Dust	—	—	—	—	40·0	45·0	40·0	45·0	3·5	4·0	—	—
2942	Bone Dust	—	—	—	—	40·0	40·0	40·0	40·0	3·5	3·7	—	—
3081	Bone Dust	—	—	—	—	40·0	45·5	40·0	45·5	3·5	3·9	—	—
3065	Guano Super.	27·0	33·6	3·0	3·6	3·0	5·0	33·0	42·2	—	—	—	—
3063	Manganese Mixture	38·0	41·1	—	—	—	—	38·0	41·1	—	—	—	—
3056	1/1 Mixture	22·0	22·6	1·0	1·3	1·0	0·4	24·0	24·3	10·3	11·3	—	—
3077	Nitrate of Soda	—	—	—	—	—	—	—	—	—	—	16·0	16·0
3058	Special Lawn Manure	7·0	11·3	7·0	5·2	8·0	8·8	22·0	25·3	6·0	6·7	—	—
2447	Sulphate of Ammonia	—	—	—	—	—	—	—	—	20·6	21·0	—	—
3057	2 : 1 Super. and Ammonia (No. 3)	30·0	28·4	1·0	2·0	1·0	0·6	32·0	31·0	6·87	8·0	—	—
3064	3 : 1 Super. and Ammonia (No 2)	34·0	37·3	1·0	1·8	1·0	0·5	36·0	39·6	5·15	4·8	—	—
3076	Sulphate of Potash	—	—	—	—	—	—	—	—	—	—	—	—
3055	Top Special Super.	45·0	47·4	—	—	—	—	45·0	47·4	—	—	—	—
3059	Top Special Super.	45·0	47·4	—	—	—	—	45·0	47·4	—	—	—	—
3062	Top Special Super	45·0	46·4	—	—	—	—	45·0	46·4	—	—	—	—
	Cresco Fertilizers, Ltd.—												
2945	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·9	—	—
2941	Bone Dust	—	—	—	—	40·0	42·5	40·0	42·5	3·5	3·6	—	—
2946	Sulphate of Ammonia (Acid)	—	—	—	—	—	—	—	—	20·0	20·9	—	—
2947	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	20·6	21·0	—	—
2943	45 Super (Granulated)	45·0	46·6	—	—	—	—	45·0	46·6	—	—	—	—
2944	45 Super.	45·0	46·1	—	—	—	—	45·0	46·1	—	—	—	—
3072	45 Super.	45·0	46·0	—	—	—	—	45·0	46·0	—	—	—	—
3087	45 Super.	45·0	46·0	—	—	—	—	45·0	46·0	—	—	—	—
3088	48 Super	48·0	50·2	—	—	—	—	48·0	50·2	—	—	—	—
3071	Super. and Ammonia 3-1	34·0	36·6	1·0	2·3	1·0	0·8	36·0	39·7	5·15	5·1	—	—
	Heddle, J. A.—												
2938	Bone Manure	—	—	—	—	28·0	32·1	28·0	32·1	4·0	4·3	—	—
3082	Bone Manure	—	—	—	—	28·0	32·8	28·0	32·8	4·0	4·4	—	—
	W. Jacobs, Ltd.—												
2937	Bone Manure	—	—	—	—	29·0	40·2	29·0	40·2	4·0	4·9	—	—
	Metropolitan and Export Abattoirs Board—												
3079	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·2	—	—
3085	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·2	—	—
2939	No. 1 Bone Manure	—	—	—	—	25·0	29·8	25·0	29·8	7·5	**6·9**	—	—
3078	No. 1 Bone Manure	—	—	—	—	25·0	27·9	25·0	27·9	7·5	7·4	—	—
2940	No. 2 Bone Manure	—	—	—	—	25·0	27·1	25·0	27·1	4·5	6·6	—	—
3080	No 2 Bone Manure	—	—	—	—	25·0	27·1	25·0	27·1	4·5	6·3	—	—
3051	Bone Manure	—	—	—	—	25·0	26·8	25·0	26·8	6·0	8·2	—	—
3084	Bone Manure	—	—	—	—	25·0	25·0	25·0	25·0	6·0	7·4	—	—
3052	Bone Dust	—	—	—	—	45·0	52·6	45·0	52·6	4·5	4·7	—	—

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate, CaSO4.		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	
	Adelaide Chemical and Fertilizer Coy., Ltd.—															
2449	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·7
2448	Bone Dust	—	—	—	—	—	—	50 0	53·5	—	—	—	—	—	—	5·3
2942	Bone Dust	—	—	—	—	—	—	50 0	63·0	—	—	—	—	—	—	5·73
3081	Bone Dust	—	—	—	—	—	—	50·0	58·5	—	—	—	—	—	—	8·8
3065	Guano Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·9
3063	Manganese Mixture	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·0
3056	1/1 Mixture	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2·12
3077	Nitrate of Soda	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·06
3058	Special Lawn Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5·03
2447	Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·3
3057	2 : 1 Super. and Ammonia (No. 3)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2·7
3064	3 : 1 Super. and Ammonia (No. 2)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4·1
3076	Sulphate of Potash	48·6	48·7	—	—	—	—	—	—	—	—	—	—	—	—	0·06
3055	Top Special Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·17
3059	Top Special Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7 9
3062	Top Special Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·5
	Cresco Fertilizers Ltd.—															
2945	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·62
2941	Bone Dust	—	—	—	—	—	—	50·0	59·0	—	—	—	—	—	—	7·4
2946	Sulphate of Ammonia (Acid)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·72
2947	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·08
2943	45 Super. (Granulated)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·93
2944	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·28
3072	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·9
3087	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·45
3088	48 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·7
3071	Super and Ammonia 3-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4·3
	Heddle, J. A.—															
2938	Bone Manure	—	—	—	—	—	—	65 0	67 2	—	—	—	—	—	—	7·9
3082	Bone Manure	—	—	—	—	—	—	65 0	65·0	—	—	—	—	—	—	5·9
	W. Jacobs, Ltd.—															
2937	Bone Manure	—	—	—	—	—	—	75·0	81·4	—	—	—	—	—	—	7·7
	Metropolitan and Export Abattoirs Board—															
3079	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12·9
3085	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·4
2939	No. 1 Bone Manure	—	—	—	—	—	—	50·0	56 0	—	—	—	—	—	—	7·25
3078	No. 1 Bone Manure	—	—	—	—	—	—	50·0	52 5	—	—	—	—	—	—	7·4
2940	No. 2 Bone Manure	—	—	—	—	—	—	55 0	61 0	—	—	—	—	—	—	6·74
3080	No. 2 Bone Manure	—	—	—	—	—	—	55 0	66 0	—	—	—	—	—	—	6·3
3051	Bone Manure	—	—	—	—	—	—	60·0	81·0	—	—	—	—	—	—	5·18
3084	Bone Manure	—	—	—	—	—	—	60·0	78·2	—	—	—	—	—	—	5·4
3052	Bone Dust	—	—	—	—	—	—	80·0	83·0	—	—	—	—	—	—	2·8

ANALYSIS OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.		Total.					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Trenwith, S. R.—												
3091	Calcium Hydroxide	—	—	—	—	—	—	—	—	—	—	—	—
	Wallaroo-Mount Lyell Fertilisers, Ltd.—												
2953	Bone Dust	—	—	—	—	40·0	40·1	40·0	40·1	3·5	3·7	—	—
2948	W.M.L. High Grade Super., 45 per cent.	45·0	47·6	—	—	—	—	45·0	47·6	—	—	—	—
2651	W.M.L. High Grade Super., 45 per cent.	45·0	48·8	—	—	—	—	45·0	48·8	—	—	—	—
3074	W.M.L. High Grade Super., 45 per cent.	45·0	44·2	—	—	—	—	45·0	44·2	—	—	—	—
3089	W.M.L. High Grade Super., 45 per cent	45·0	47·2	—	—	—	—	45·0	47·2	—	—	—	—
3090	W.M.L. 48 per cent. Super.	48·0	50·2	—	—	—	—	48·0	50·2	—	—	—	—
3075	Special Mixture R.A.G.C.	6·48	6·0	—	—	—	—	6·48	6·0	11·7	12·2	—	—

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate, CaSO4.		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Trenwith, S. R.—															
3091	Calcium Hydroxide	—	—	20·0	39 5	—	—	—	—	80·0	84·0	—	—	—	—	3·1
	Wallaroo-Mount Lyell Fertilisers Ltd.—															
2953	Bone Dust	—	—	—	—	—	—	50 0	52·0	—	—	—	—	—	—	4·9
2948	W.M.L. High Grade Super. 45 per cent.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·8
2651	W.M.L. High Grade Super. 45 per cent	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2·94
3074	W.M.L. High Grade Super. 45 per cent.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·9
3089	W.M.L. High Grade Super. 45 per cent.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·6
3090	W.M.L. 48 per cent. Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·2
3075	Special Mixture R.A.G.C.	6·26	6·5	—	—	—	—	—	—	—	—	—	—	—	—	2·0

ANALYSES OF FERTILISERS—*continued*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates	
		Water Soluble.		Citrate Soluble.		Acid Soluble		Total					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Wingfield Casing Coy., Pty., Ltd.—												
3053	Blood Manure	—	—	—	—	—	—	—	—	12·0	13·1	—	—
3054	Blood Manure	—	—	—	—	—	—	—	—	11·0	11·4	—	—
3060	Blood Manure	—	—	—	—	—	—	—	—	12·0	13·0	—	—
3061	Blood Manure	—	—	—	—	—	—	—	—	11·0	11·4	—	—
3073	Bone Manure	—	—	—	—	31·0	33·8	—	—	4·0	3·7	—	—
	Wooltana Fertilisers Ltd.—												
3067	Wooltana Fertiliser	2·5	5·6	10·0	11·7	20·0	19·2	32·5	36·5	2·5	2·1	—	—
3069	I.C.I Sulphate of Ammonia	—	—	—	—	—	—	—	—	20·6	20·8	—	—

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate, CaSO4.		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Wingfield Casing Coy., Pty., Ltd.—															
3053	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·0
3054	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·31
3060	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11·1
3061	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·2
3073	Bone Manure	—	—	—	—	—	—	50·0	68·3	—	—	—	—	—	—	6·4
	Wooltana Fertilisers Ltd.—															
3067	Wooltana Fertiliser	—	—	—	—	—	—	—	—	—	—	—	—	55·0	72·0	12·3
3069	I.C.I. Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·2

Following are results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers during the six months ended 31st December, 1936.

NOTE.—*Deficiencies greater than permitted under section 12 of the Act are shown in bold type.*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.		Total.					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertiliser Co, Ltd.—												
3099	2 · 1 Super. and Ammonia No. 3	30·0	33·2	1·0	1·5	1·0	0·5	32·0	35·2	6·87	6·4	—	—
3217	Nitrate of Soda	—	—	—	—	—	—	—	—	—	—	16·0	16·0
	Cresco Fertilisers Ltd.—												
3094	Bone Dust	—	—	—	—	40·0	42·8	40·0	42·8	3·5	3·4	—	—
3213	Bone Dust	—	—	—	—	40·0	**35·4**	40·0	**35·4**	3·5	5·85	—	—
3093	45 Super.	45·0	44·9	—	—	—	—	45·0	44·9	—	—	—	—
	W. Jacobs Ltd.—												
3214	Bone Manure	—	—	—	—	29·0	38·0	29·0	38·0	4·0	5·1	—	—
	Metropolitan and Export Abattoirs Board—												
3211	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·7	—	—
3216	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·9	—	—
3209	No 1 Bone Manure	—	—	—	—	25·0	**22·2**	25·0	**22·2**	7·5	7·9	—	—
3210	No. 2 Bone Manure	—	—	—	—	25·0	43·0	25·0	43·0	4·5	5·3	—	—
3212	No 2 Bone Manure	—	—	—	—	25·0	27·1	25·0	27·1	4·5	6·6	—	—
3215	Bone Manure	—	—	—	—	25·0	23·2	25·0	23·2	6·0	7·9	—	—
	Wallaroo-Mount Lyell Fertilisers Ltd.—												
3097	W M.L. High Grade Super. 45 per cent.	45·0	47·0	—	—	—	—	45·0	47·0	—	—	—	—
3095	Island Phosphate	—	—	—	—	82·0	89·1	82·0	89·1	—	—	—	—
3218	Special Lawn Manure	7·0	8·9	7·0	7·5	8·0	7·2	22·0	23·6	6·0	6·8	—	—
3096	Sulphate of Ammonia	—	—	—	—	—	—	—	—	20·6	20·9	—	—
	Wingfield Casing Coy., Pty, Ltd —												
3098	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·4	—	—
3203	Bone Manure	—	—	—	—	31·0	32·2	31·0	32·2	4·0	4·6	—	—
3204	Ground Oyster Shell	—	—	—	—	—	—	—	—	—	—	—	—

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate, CaSO4.		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertiliser Co., Ltd.—															
3099	2 : 1 Super. and Ammonia No. 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3·1
3217	Nitrate of Soda	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·05
	Cresco Fertilisers Ltd.—															
3094	Bone Dust	—	—	—	—	—	—	50·0	65·0	—	—	—	—	—	—	9·0
3213	Bone Dust	—	—	—	—	—	—	50·0	54·1	—	—	—	—	—	—	7·5
3093	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·0
	W. Jacobs Ltd.—															
3214	Bone Manure	—	—	—	—	—	—	75·0	76·8	—	—	—	—	—	—	6·2
	Metropolitan and Export Abattoirs Board—															
3211	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·15
3216	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·8
3209	No. 1 Bone Manure	—	—	—	—	—	—	50·0	50·4	—	—	—	—	—	—	7·86
3210	No 2 Bone Manure	—	—	—	—	—	—	55·0	77·2	—	—	—	—	—	—	5·7
3212	No 2 Bone Manure	—	—	—	—	—	—	55·0	72·5	—	—	—	—	—	—	6·6
3215	Bone Manure	—	—	—	—	—	—	60·0	72·6	—	—	—	—	—	—	6·2
	Wallaroo-Mount Lyell Fertilisers Ltd.—															
3097	W.M.L. High Grade Super 45 per cent.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·8
3095	Island Phosphate	—	—	—	—	—	—	—	—	—	—	—	—	100·0	99·8	2·4
3218	Special Lawn Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1·2
3096	Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·2
	Wingfield Casing Coy. Pty., Ltd.—															
3098	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·5
3203	Bone Manure	—	—	—	—	—	—	50·0	65·0	—	—	—	—	—	—	12·7
3204	Ground Oyster Shell	—	—	45·0	39·7	—	—	—	—	35·0	46·5	—	—	—	—	8·1

Egg-Laying Competitions

Official Single Test conducted at Parafield

Review of the Competition for the month of February, 1937, by C. F. Anderson (Chief Poultry Adviser) and A. Clifton (Competition Attendant).

The weather conditions have again been almost ideal for egg production during the month of February. No prolonged spells of heat have been experienced, as is usual at this time of the year. With spells of heat, production very quickly falls off, but the present summer is one of the best we have experienced for many years, from the point of view of egg production. The laying shows a slight decline for February, as compared with January, but this is only to be expected, as the birds have now been laying consistently for the past 11 months. However, the production is entirely satisfactory, and the White Leghorns—especially in the Wet Mash Section—are laying extra well considering this is the final phase of the Competition.

Again, the White Leghorns compare more than favourably with any of the other breeds in the Competition. The laying of the Black Orpingtons and Rhode Island Reds has been particularly disappointing this season. The White Leghorn teams owned by Mr. A. Young and Mr. W. M. Field have laid exceptionally well, and it appears almost sure now that both these teams will finish with a score somewhere around 1,320 first grade eggs. This is a particularly good score, considering the conditions governing first grade eggs.

The White Leghorn, number 315, owned by Mr. C. A. Maxwell has again laid well during the month, and it appears that this bird is almost sure to occupy first place in the competition, and considering the way in which she is laying, the score of around 270 first grade eggs seems nearly assured.

The leading Black Orpington owned by Willow Bend Stud Poultry Farm lost one week's lay through broodiness in February, allowing Mr. A. G. Dawes' bird to draw level, but at the end of the month laid six eggs in the last week, and the Black Orpington is again one egg in front. Without the laying of many underweight eggs, the Dry Mash bird, No. 449, owned by Mr. A. O. Dawkins would have been almost level with the best White Leghorns in the Wet Mash, but the number of underweight eggs has kept her back. However, she has even now the creditable score of 228 first grade eggs.

One of the features of the laying for the month of February is the higher percentage of first grade eggs, and considering that a first grade egg at this period of the year has to be a minimum of 2ozs., the daily average of 70 per cent. is very satisfactory, compared with 63 per cent. for January and 61 per cent. for December.

The average daily production of all eggs for the month under review was 48 per cent.

LEADING SCORES TO 2nd MARCH, 1937.—FIRST GRADE EGGS ONLY.

SECTION I.—WET MASH.

Class 1.—White Leghorns—351 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
C. A. Maxwell	250	315
J. G. Slee	244	346
B. R. Whittington	238	215
S. Lambert	236	194
Trios—		
W. M. Field	650	142–144
L. A. King	643	217–219
A. Young	632	7–9
Teams—		
A. Young	1,220	7–12
W. M. Field	1,217	139 144
J. C. Normandale	1,150	235–240

Class 2.—Any other Light Breed (Minorcas)—15 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
R. M. Yelland	190	371
V. F. Gameau	188	366
Langmaid and Bettison	169	361
Trios—		
Langmaid and Bettison	432	358–360
R. M. Yelland	352	370–372
V. F. Gameau	318	364–366
Teams—		
Langmaid and Bettison	694	358–363
V. F. Gameau	463	364–369

Class 3.—Black Orpingtons—45 birds competing

Singles—		
Willow Bend Stud Poultry Farm	237	381
A. G. Dawes	235	377
Willow Bend Stud Poultry Farm	224	380
Trios—		
Willow Bend Stud Poultry Farm	646	379–381
A. G. Dawes	589	376–378
H. J. Mills	559	385–387
Teams—		
Willow Bend Stud Poultry Farm	1,155	379–384
H. J. Mills	995	385–390
A. G. Dawes	988	373–378

Class 4.—Any other Heavy Breed—36 birds competing.

Singles—		
A. G. Dawes (Rhode Island Red)	214	419
A. G. Dawes (Rhode Island Red)	204	38
K. Pennack (Barnevelder)	204	438
Trios—		
K. Pennack (Barnevelders)	559	436–438
V. F. Gameau (Rhode Island Reds)	415	433–435
Teams—		
K. Pennack (Barnevelders), 5 birds only	928	436–441
V. F. Gameau (Rhode Island Reds)	713	430–435
A. G. Dawes (Rhode Island Reds)	696	37–42

SECTION II.—DRY MASH.

Class 5.—White Leghorns—15 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
A. O. Dawkins	228	449
A. O. Dawkins	215	452
A. O. Dawkins	184	453
Trios—		
A. O. Dawkins	561	451–453
A. O. Dawkins	546	448–450
Willow Bend Stud Poultry Farm	417	454–456
Teams—		
A. O. Dawkins	1,107	448–453
Willow Bend Stud Poultry Farm	694	454–459

Class 7.—Black Orpingtons—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	192	466
Willow Bend Stud Poultry Farm	186	468
Trios—		
Willow Bend Stud Poultry Farm	484	466–468
Teams—		
Willow Bend Stud Poultry Farm (5 birds competing)	762	463–468

Class 8.—Rhode Island Reds—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	134	470
Willow Bend Stud Poultry Farm	126	472
Trios—		
Willow Bend Stud Poultry Farm	371	469–471
Willow Bend Stud Poultry Farm	266	472–474
Teams—		
Willow Bend Stud Poultry Farm	637	469–474

SECTION III.—WET MASH.

Class 9.—Any Breed—27 birds competing.
(Home Project Utility Section.)

Name. School. Breed.		
Anthony Rix, Williamstown, White Leghorn	231	478
Warren Hannaford, Paracombe, White Leghorn	222	486
Stanley Pratt, Abattoirs, White Leghorn	213	477
Ray Couche, Thebarton, White Leghorn	206	485
Keith Oliver, McLaren Vale, Black Orpington	206	498

Feeding Tests at Parafield Poultry Station

[By C. F. Anderson, Chief Poultry Adviser.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April, 1935, to 28th February, 1937.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal, 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

5. *Mash*, during autumn and winter.—Crushed barley, crushed wheat, chaffed greenfeed and meatmeal. During spring and summer the mash is varied, bran being substituted for the crushed barley.

Grain.—2ozs. wheat per day.

	No. Eggs Laid 1st April, 1935, to 31st January, 1937.	No. Eggs Laid Month of February, 1937.	Total Eggs Laid 1st April, 1935, to 28th February, 1937.
No. 1 Test	12,591	474	13,065
No. 2 Test	12,663	371	13,034
No. 3 Test	13,387	470	13,857
No. 4 Test	10,827	324	11,151
No. 5 Test	11,639	394	12,033

FIELD DAY, WOOD'S POINT.

The Jervois Branch—on behalf of Branches in the River Murray Swamps area—has for several years sponsored Conferences in the form of Field Days at Wood's Point, by courtesy of Messrs. H. W. Morphett & Co. On the occasion of the Conference on 18th February the party was shown over the property by Mr. P. J. Baily and his son, Mr. F. P. Baily, who is Secretary of the Branch. Topical addresses were given at suitable places of interest by Mr. W. J. Spafford (Director of Agriculture), Dr. J. G. Davies and Mr. C. M. Donald (Waite Agricultural Research Institute), Mr. H. B. Barlow (Chief Dairy Instructor), and Dr. A. R. Callaghan (Principal Roseworthy Agricultural College). Mr. A. J. A. Koch represented the Advisory Board of Agriculture.

Phosphatic Manure

In a Wireless Talk through the National Broadcasting Station, 5CL, Mr. R. C. Scott (Chief Agricultural Adviser), gave the appended brief discussion on Phosphatic Manure and its Application.

This subject concerns not only the farmer, but also the home gardener. As you know, all plants require food and water for their existence, and there is one plant food that is universally lacking in South Australian soils, namely, phosphorous. An excess of any other plant food does not make good this deficiency, and although the soil in your garden or on your farm may be abundantly supplied with every other requirement, plants cannot make full growth if phosphorous is the limiting factor. Should the shortage be made good plants and crops are able to obtain their food requirements in the correct proportions and produce maximum yields. Since South Australian, and in fact the soils of the Commonwealth are deficient in phosphorus, this shortage must be made good from some outside source. The farmer recognises this and rarely plants a crop without adding phosphorus in the form of superphosphate.

Statistical returns show that over 90 per cent. of the area under crop in South Australia is treated with phosphatic fertiliser On the other hand the average home gardener rarely applies any fertiliser except perhaps a limited amount of farmyard manure. If the addition of phosphate has been found necessary for the growing of cereals, and such is the case, it is equally necessary for the proper development of home garden plants including lawns. Consequently, superphosphate should be more generally used in Adelaide gardens than it is to-day.

It is pleasing to be able to state that the value of superphosphate was first demonstrated in South Australia by experiments conducted at Roseworthy Agricultural College in the period 1883 to 1885 by the Principal at that time, Professor Custance. His successor, Professor Lowrie, continued the work and did more than other man in drawing attention to its value and advocating its general use throughout the State.

Although there are several forms of phosphatic fertiliser we need only concern ourselves with two, namely, bones in the form of bone dust, and superphosphate. The latter is far and away the more important. Bones have been used from the earliest times and it is recorded that about a hundred years ago the demand was so great that even the battlefields of Europe were ransacked for further supplies. However, it was not until toward the middle of the last century that it was realised that the value of bones lay in the phosphate they contained. This discovery was of tremendous importance so far as phosphatic manuring was concerned, since it opened up the possibility of obtaining supplies from some other source. The calcium phosphate in bones is present in an insoluble form and in order that it may be readily attacked by moisture in the soil and thus made available for plants, it is necessary that the bones should be ground to a fine powder. This is put on the market under the name of bone dust. Bone dust has been available for a very long time and as growers have become accustomed to handling it they continue to use this fertiliser in preference to other types of phosphate, with the result that the demand for ground bone is greater than the supply. In consequence, values are increased, and when the price per unit of fertilising material is taken into consideration comparatively with superphosphate the user generally pays dearly for his fertiliser.

On the other hand bone dust is a good manure for market garden and home garden crops generally, especially for those planted on sandy or gravelly soils—that are lacking in lime. Of course these crops would be irrigated if necessary and the moisture would assist in making the phosphate in the bones steadily available for the use of plants.

A fair dressing of bone dust would be about 1lb. per square yard worked into the soil or for crops such as peas, beans, &c., that are sown in rows, an equivalent dressing should be sprinkled in the rows themselves. However, the cereal grower would not use bonedust and superphosphate is a more economic manure for him.

Superphosphate is manufactured by treating insoluble calcium phosphates with sulphuric acid when the insoluble phosphate is converted into a soluble form, and what is commercially described as 45 superphosphate means that the fertiliser contains 45 per cent. of tricalcium phosphate that has been rendered soluble.

Deposits of rock phosphate are found in several parts of the world, and Australia obtains her supplies from Nauru and Ocean Islands, which are placed close to the equator in a north-north-easterly direction from Australia. It is estimated that the quantity of phosphate on these two islands is not less than 100 million tons, and as the exports of recent years have been from 600,000 to 700,000 tons annually, the deposits will supply the demand for many more years.

The history of Nauru is rather interesting. The island was discovered in 1789 and annexed by Germany in 1888. However, it was not until 1900 that the phosphate deposits were discovered. An officer of the Pacific Islands Company had visited Nauru in connection with ordinary trade, and whilst there picked up a rock specimen of unusual structure, and took it to Australia to show his friends in Sydney. After being admired and classified as fossilised wood it was used as a door stop until one of the directors who had been looking after the phosphate section of the company was struck by the resemblance between this supposed piece of fossilised wood and the phosphate rock of other Pacific Islands. He had portion of it analysed and found it to be phosphate rock of unusually high quality. After further investigation as to the quantity available the Pacific Phosphate ompany was formed and commenced operations.

In November of 1914, that is to say 5 months after the outbreak of war, Nauru was occupied by a detachment from the Australian Naval and Military Expedition at Rabaul, and Nauru was included in the cession of colonies made by Germany in 1919.

In that year the interest of the Pacific Phosphate Co. in the two islands was purchased by the British, Australian and New Zealand Governments for three and a half million pounds, the purchase money being contributed in the proportion of 42 per cent. by Great Britain, 42 per cent. by Australia and 16 per cent. by New Zealand. The agreement was that the three countries should receive the output from the deposits in the same proportion as the purchase money contributed, but if in any year any of the three Governments did not require any portion of its allotment the other Governments were entitled to share in that portion. At the present time England is not taking phosphates from these deposits and all manure mined is exported to Australia and New Zealand. The raw rock contains from 85 to 88 per cent. tricalcic phosphate, and when finely ground is sometimes used as a fertiliser, but practically all of material imported into this State is manufactured into superphosphate. In South Australia over 180,000 tons of superphosphate per annum have at times been used, although of recent years in consequence of the low price of agricultural produce the quantity applied to the land has been less, and amounted to 150,000 tons in 1933-34. However, such reduction is false economy and with the recovery in prices, heavier applications and greater total output can be anticipated.

The profitable dressing for cereal crops varies according to the average rainfall of the district, and for the dryer areas the numerous experiments conducted by the department indicate that applications of from ¾cwt. to 1cwt. of 45 per cent. superphosphate are most payable. When the rainfall approaches 17in. the quantity can be increased to 1½cwts., whilst in the wetter districts it should be not less than 1½cwts., and in many cases 2cwts. to the acre is a distinctly profitable application.

For pastures in the wetter areas the dressings can be increased with advantage, and from 1¾cwts. to 2cwts. per acre should be the general application with still larger quantities for the high producing pastures of the wet lands. For home gardens, a dressing of from ½lb. to 1lb. per square yard will be found beneficial, and this should be a universal application when plants are established.

In conclusion it is desired to urge strongly a general increase in the quantity of superphosphate applied particularly with crops and pastures in the higher rainfall districts since experiments in this State and the experience of other countries indicate that the average dressing applied at the present time is not the most profitable.

Agricultural Bureau of South Australia

Lower North Farmers' Conference

The first of the 1937 series of Conferences of the Agricultural Bureau was held at Wasleys on February 25th. From the commencement of the proceedings until the conclusion of the final session, the attendance was all that could be desired, delegates being present from most of the Branches situated in the districts covered by the Conference.

The members of the Men's and Women's Branches staged a very fine exhibit of the products of the district—fresh and dried fruit and vegetables, cereals, fodders and grasses, in addition to a fine collection of articles of Women's handicrafts.

Mr. R. P. Currie, Chairman of the local branch of the Bureau presided, and in extending a welcome to delegates and visitors, said that the Wasleys District had enjoyed a good season for both cereals and fat lambs. He estimated that an average of 18-20 bushels of wheat to the acre had been reaped throughout the district, while for the production of fat lambs, Wasleys breeders had enjoyed a prominent place in the early sales.

Mr. A. M. Dawkins (Member of the Advisory Board of Agriculture) delivered the Opening Address. Mr. V. H. Day (Wasleys) read a paper "Hints on the Farm." Messrs. W. J. Spafford (Director of Agriculture), R. C. Scott, H. B. Barlow, C. F. Anderson, other officers of the Department of Agriculture, and C. T. McKenna, B.V.Sc., of the Stock and Brands Department, took part in the discussions and replied to questions.

Prizes won in the Central Crop Competition were presented by Mr. W. J. Spafford, First Prize being won by T. Shanahan; Second, A. Sissman; Third, A. M. Dawkins. Special Prize for the cleanest crop—Elliott Day. Mr. Shanahan also won the prize donated by the Millers' Produce Co. Ltd.

Mr. A. G. Barrett of Barrett Bros., Maltsters, donated the trophy for the winning crop in the Barley Competition run in conjunction with the Central Crop Competition, which was won by J. H. Dawkins, who tied with C. Tremlitt for second place.

Group of delegates at the Lower North Conference, 25th February.

Conference at Koolunga

Mid-Northern Branches of the Agricultural Bureau met in Conference at Koolunga on 11th March, and Mr. H. A. Spencer presided over a large attendance of delegates. Proceedings were opened by the Hon. A. P. Blesing, M.L.C. (Minister of Agriculture), who, at the instance of the Hon. A. L. McEwin, M.L.C. (Chairman of the Advisory Board of Agriculture), seconded by Mr. J. A. Lyons, M.P., was accorded a hearty vote of thanks for opening the Conference.

In addition to numerous questions, which were answered by Messrs. W. J. Spafford (Director of Agriculture), R. C. Scott (Chief Agricultural Adviser), H. B. Barlow (Chief Dairy Instructor), and Mr. W. S. Smith, B.V.Sc. (Government Veterinary Officer), the following papers were read and discussed:—"Bulk Handling Wheat in New South Wales," Mr. S. T. Le Page (Koolunga); "The Management of Pigs," Mr. T. Welbourn (Narridy); "Sheep and the Blowfly Pest," Messrs. H. J. Crouch and F. A. Wheaton (Redhill).

It was decided—"That the 1938 Conference should be held at Narridy"; "That a Pig Expert be appointed to the staff of the Department of Agriculture"; "That we ask for the bounty of superphosphate to be 15s. again this year"; "That we request country representation of sales and service of superphosphate"; "That this Conference considers that the suggested radius of 25 miles for subsidised veterinary lodges is impracticable"; "That district councils be more strict in enforcing the Noxious Weeds Act."

Mr. McEwin presented trophies to the successful competitors in the Mid-North Wheat Crop Competitions. The secretarial duties of the Conference were admirably carried out by Mr. J. W. Sykes.

Some of the delegates at the Koolunga Conference on 17th March

Advisory Board of Agriculture

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, 24th February, there being present Hon. A. L. McEwin, M.L.C. (Chairman), Messrs. R. H. Martin, A. M. Dawkins, H. N. Wicks, F. Coleman, P. J. Baily, W. J. Spafford (Director of Agriculture), Professor A. J. Perkins, Dr. A. E. V. Richardson and the Secretary, H. C. Pritchard. Apologies were received from Messrs. S. Shepherd J. B. Murdoch and A. J. A. Koch.

Life Membership.—In view of the valuable and lengthy services rendered to the Agricultural Bureau and to the agricultural interests of the State, the Board unanimously decided to award a Special Certificate of Life Membership to Mr. R. Wiese, and to present this at the forthcoming Bordertown Conference.

New Branch.—Conditional approval was given to the formation of a Women's Branch at Murraminga.

New Members.—The following names were added to the rolls of existing Branches:—Clarendon—F. Stevens; Frayville—M. A. Borman; Inman Valley—A. G. Wallman; Kalangadoo Women's—Mrs. R. P. Davies; Karte Women's—Mrs. Ray Freeman; Koolunga Women's — Miss Thelma Whitehorn, Miss Joyce Fuller; McLaren Flat Women's—Mrs. N. Low; McLaren Flat—G. Ward; Mount Compass —E. T. Chigwidden; Mount Pleasant—A. Hicks, R. J. Chibnall, R. R. Smith; Nantawarra—J. A. Atkinson, E. S. Atkinson; Narridy Women's—Mrs. W. Frick; Nelshaby—F. A. McDougall; Penwortham —John A. Travers, John D. Jonas, Edward Bannon; Renmark North and Chaffey—Karl Weidenhofer; Robe—H. Clarke, S. J. McIntyre, N. Hayes, J. J. Elliott, L. McInnes; Strathalbyn Women's—Mrs. C. S. Hassam; Tatiara—L. L. Larwood; Wasleys Women's—Mrs. B. Buckby; Willowie Women's—Mrs. S. Brooks, Mrs. L. Crisp, Mrs. L. McCallum, Miss F. McCallum, Miss M. McCallum, Miss E. McCallum; Wirrabara Women's—Mrs. Kay. Several items submitted by Conferences and Branches were considered.

Wastefulness on the Farm.

Mr. H. Wundersitz read the following paper at the January meeting of the Hartley Branch:—On many farms foolish waste is too often very apparent. Carelessness is the general impression that is formed when inspecting the sheds and paddocks. When an implement—which has cost much money—is finished with for the time being, it is left out in the weather, and sun and rain soon have a destructive effect on it. In working the machine, look out for bolts and nuts becoming loose, and if lost or broken they should be replaced, and not repaired with fencing wire. Such carelessness is wasteful, and costly machines soon have to be replaced. Making a good shed and keeping the machinery under cover is not nearly so expensive. In the stables more waste is evident. Harness which was new not long ago is left lying on the ground or in the hot sun where the leather soon perishes.

The manure is allowed to accumulate and become a breeding ground for flies, which worry the livestock and cause endless trouble. It should be carted into the fields at frequent intervals, and the land will get the full benefit of it. With the water supply further waste is noticed —leaky tanks, troughs, and taps. All tools and appliances should be kept in their appointed place, and returned thereto whenever they have been used. This will save much time when next required. At the haystack so much valuable fodder is wasted through fowls and weather getting into it that the quantity saved would soon be sufficient to pay for a hay shed. Next, the gates and fences. Here again much waste is represented with barbed wire entanglements which serve as gates. Gates are fairly cheap now. When a fence wire or post is broken it should be at once repaired, or there will very soon be a great many to replace, because one broken post becomes an extra strain on the next one. Bad fences teach stock bad habits, and they destroy a lot of fencing. (Secretary, W. J. Brook.)

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of February, 1937; also the average precipitation for February, and the average annual rainfall.

Station.	For Feb., 1937.	Av'ge for Feb.	To end Feb., 1937.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	0 07	0·54	0·37	4·60
Marree	0·27	0·48	2·41	5·80
Farina	0·72	0·51	3·15	6·37
Copley	0·83	0·51	2·37	7·76
Beltana	0·93	0·68	2·72	8 39
Blinman	1·69	0·72	5·12	11·71
Hookina	0·52	0·45	5·23	10·94
Hawker	0·56	0·57	6·74	12 09
Wilson	0·25	0·63	5·71	11·65
Gordon	0 47	0·76	5·32	10·33
Quorn	3·34	0·60	7·04	13·10
Port Augusta	0·78	0·51	3·38	9·40
Bruce	2·25	0·58	6·18	9·74
Hammond	1·32	0·59	4·40	11·05
Wilmington	0·93	0 60	4·94	17·18
Willowie	0·73	0·71	4·22	12·10
Melrose	1·55	0·85	5·21	22·80
Booleroo Centre	0·62	0 65	4·18	15·14
Port Germein	0·62	0·51	3·07	12·51
Wirrabara	1·21	0·66	4·36	19·22
Appila	1·24	0·66	4·19	14·59
Cradock	0·54	0·65	5·24	10·67
Carrieton	0·40	0·57	4 11	12·11
Johnburg	1·38	0·53	6·10	10·49
Eurelia	1·05	0·61	4·59	12·66
Orroroo	0·80	0·63	4·71	13·12
Nackara	1·94	0·68	6·31	11·09
Black Rock	0·45	0·62	3·51	12·26
Oodlawirra	1·65	0·62	5 51	11·34
Peterborough	0·49	0 60	3 36	13·14
Yongala	0·61	0·66	4·02	14·37
North-East				
Yunta	2·60	0·60	7·39	8·44
Waukaringa	1·00	0·50	6·11	7·82
Mannahill	1·79	0·66	5·85	8·08
Cockburn	0·65	0·57	4·04	7·81
Broken Hill	0·78	0·81	3·79	9·40
Lower North.				
Port Pirie	1·62	0·52	3·78	13·18
Port Broughton	1·57	0·53	3·34	13·87
Bute	1·01	0·52	2·50	15·42
Laura	0·50	0·69	3·33	17·93
Caltowie	0·94	0·69	3·58	16·69
Jamestown	0·26	0·65	3·64	17·68
Gladstone	0·32	0·61	3·17	16·31
Crystal Brook	1·66	0·62	4·29	15·79
Georgetown	0·07	0·71	2·98	18·24
Narridy	0 69	0·61	3·56	15·74
Redhill	1·09	0·62	3·37	16·55
Spalding	0·35	0·78	3·17	18·68
Gulnare	0·40	0·77	2·95	18·51
Yacka	1·21	0·63	3·81	15·38
Koolunga	0 44	0·64	2·72	15·29
Snowtown	1·97	0·53	3·78	15·69
Lower North—*continued.*				
Brinkworth	1·07	0·66	2·85	15·72
Blyth	0·43	0·62	2·08	16·73
Clare	1·28	0·81	3·80	24·43
Mintaro	0·45	0·72	2·60	23·30
Watervale	0·57	0·77	3·58	26·69
Auburn	0·60	0·82	2·93	23·92
Hoyleton	0·49	0·55	2·76	17·25
Balaklava	1·84	0·56	3·77	15·41
Port Wakefield	1·65	0·63	3 12	12·93
Terowie	1·21	0·80	4·29	13·27
Whyte-Yarcowie	1·69	0·70	4·51	13·54
Hallett	2·14	0·70	4·87	16·39
Mount Bryan	1·64	0·80	4·02	16·76
Kooringa	1·61	0·68	3·52	17·78
Farrell's Flat	0·29	0·65	2·75	18·52
West of Murray Range.				
Manoora	0·38	0·62	2·24	18·91
Saddleworth	1·13	0·70	3·46	19·56
Marrabel	0·23	0·61	2·62	19·91
Riverton	0·60	0·67	2·70	20·79
Tarlee	0·25	0·63	2·18	18·06
Stockport	0·33	0·60	2·10	17·02
Hamley Bridge	0 65	0·63	2 42	16·52
Kapunda	0 29	0·69	2·04	19·74
Freeling	0·35	0·60	1·99	17·79
Greenock	0·74	0·69	2·79	21·47
Truro	1·01	0·67	2·61	19·75
Stockwell	0·45	0·71	2·25	20·02
Nuriootpa	0·86	0·66	3·27	20·74
Angaston	1·58	0·70	4·03	22·33
Tanunda	0·53	0·65	3·16	21·97
Lyndoch	0·52	0·67	3·02	23·28
Williamstown	1·22	0·70	4·47	27·54
Adelaide Plains.				
Owen	0·82	0·71	2·51	14·78
Mallala	0 83	0·61	2·18	16·43
Roseworthy	0·32	0·56	1·99	17·43
Gawler	0·65	0·67	3·04	18·85
Two Wells	0·45	0·55	1·97	15·80
Virginia	0·58	0·58	2·71	17·22
Smithfield	1·09	0·70	4·79	17·68
Salisbury	1·02	0·62	3·95	18·55
Adelaide	0·79	0 72	3·21	21·17
Glen Osmond	0·60	0·69	3·59	25·97
Magill	1·27	0 78	3·83	25·36
Mount Lofty Ranges.				
Teatree Gully	0·95	0 84	4·41	27·03
Stirling West	0 67	1·18	5·61	47·01
Uraidla	1·52	1·06	5 60	43·83
Clarendon	0·47	0·85	3·12	32·81
Happy Val'y Res.	0·72	—	3·12	—
Morphett Vale	0·79	0·71	2·70	22·62
Noarlunga	0·47	0·68	2·20	20·35
Willunga	0·18	0·78	2·26	25·96
Aldinga	0·17	0·67	3·05	20·21

RAINFALL—*continued.*

Station.	For Feb., 1937.	Av'ge. for Feb.	To end Feb., 1937.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued*.				
Myponga	0·26	1·05	3·02	29·72
Inman Valley	0·11	—	2·55	—
Yankalilla	0·21	0·75	2·24	22·78
Mount Compass	0·15	1·24	2·96	36·25
Mount Pleasant	0·97	0·76	4·18	27·08
Birdwood	0·82	0·70	3·89	29·02
Gumeracha	0·66	0·81	5·01	33·28
Millbrook Res.	1·00	1·02	5·75	34·50
Lobethal	0·93	0·87	5·44	35·94
Woodside	0·68	0·87	3·96	32·16
Hahndorf	0·90	0·84	5·07	34·82
Nairne	0·39	0·89	3·73	28·14
Mount Barker	0·60	0·90	0·39	31·24
Echunga	0·37	0·90	3·93	33·30
Macclesfield	0·37	0·88	2·79	30·37
Meadows	0·65	0·96	3·34	36·02
Strathalbyn	0·26	0·72	2·08	19·34
MURRAY FLATS AND VALLEY.				
Meningie	0·51	0·60	1·90	18·29
Milang	0·15	0·56	1·86	14·85
Langhorne's Ck	0·10	0·60	2·06	14·93
Wellington	0·46	0·58	2·31	14·66
Tailem Bend	0·37	0·77	2·47	15·07
Murray Bridge	0·10	0·58	1·54	13·49
Callington	0·12	0·56	2·21	15·14
Mannum	1·53	0·49	2·95	11·49
Palmer	1·46	0·65	3·52	15·63
Sedan	2·25	0·53	3·58	12·01
Swan Reach	1·05	0·69	2·25	10·62
Blanchetown	0·82	0·55	2·02	10·95
Eudunda	3·14	0·65	4·96	17·13
Point Pass	1·19	0·58	2·92	16·66
Sutherlands	2·64	0·50	4·23	10·71
Morgan	1·76	0·55	3·20	9·10
Waikerie	0·95	0·93	2·34	9·59
Overland Corner	0·64	0·64	1·78	10·18
Loxton	0·38	0·90	1·44	11·34
Berri	0·49	0·83	1·83	10·03
Renmark	0·36	0·73	2·54	10·33
WEST OF SPENCER'S GULF.				
Eucla	0·40	0·66	0·65	10·08
Nullarbor	0·23	0·46	0·53	8·87
Fowler's Bay	0·08	0·48	0·30	11·93
Penong	0·16	0·69	0·39	12·28
Koonibba	0·95	0·80	1·25	12·18
Denial Bay	0·32	0·61	0·63	11·33
Ceduna	0·37	0·56	0·61	10·32
Smoky Bay	1·12	0·50	1·20	10·50
Wirrulla	3·95	0·43	4·45	10·87
Streaky Bay	0·37	0·48	0·75	14·91
Chandada	0·74	0·33	1·05	12·66
Minnipa	0·52	0·76	1·82	13·97
Kyancutta	0·26	0·64	0·95	13·45
Talia	0·40	0·43	0·91	14·76
Port Elliston	1·68	0·43	2·13	16·53
Lock	1·39	0·73	2·16	16·44
Mount Hope	3·47	—	4·04	—
Yeelanna	2·16	0·48	2·86	16·11
Cummins	2·68	0·55	3·30	17·70
Port Lincoln	0·60	0·51	1·53	19·35
Tumby	0·90	0·54	1·57	14·29
Ungarra	2·18	0·71	3·10	16·94
Port Neil	0·48	0·73	1·43	13·16

Station.	For Feb., 1937.	Av'ge. for Feb.	To end Feb., 1937.	Av'ge. Annual Rain-fall.
WEST OF SPENCERS GULF—*continued*.				
Arno Bay	1·10	0·65	2·03	12·82
Rudall	1·52	0·70	2·34	13·23
Cleve	0·48	0·67	1·28	14·96
Cowell	0·34	0·62	1·35	11·06
Miltalie	3·04	0·66	4·20	13·75
Mangalo	0·38	0·77	1·34	13·86
Darke's Peak	1·97	0·76	2·96	15·24
Kimba	0·33	0·83	1·44	11·84
YORKE PENINSULA.				
Wallaroo	0·91	0·52	2·17	13·97
Kadina	1·68	0·52	2·96	15·59
Moonta	2·03	0·53	3·34	15·04
Paskeville	0·80	0·48	2·22	15·44
Maitland	1·17	0·64	2·64	19·86
Ardrossan	0·61	0·48	2·39	13·96
Port Victoria	0·92	0·50	2·02	15·39
Curramulka	0·42	0·51	1·74	17·81
Minlaton	0·34	0·49	1·72	17·72
Port Vincent	0·40	0·58	1·42	14·37
Brentwood	1·34	0·53	2·37	15·61
Stansbury	0·27	0·49	1·61	16·81
Warooka	0·97	0·53	2·13	17·44
Yorketown	0·17	0·49	1·08	16·88
Edithburgh	0·24	0·53	1·37	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	0·86	0·53	1·75	24·87
Kingscote	0·21	0·58	1·22	19·27
Penneshaw	0·19	0·73	1·41	19·18
Victor Harbour	0·10	0·71	2·69	21·43
Port Elliot	0·20	0·71	2·89	19·94
Goolwa	0·11	0·68	2·59	17·84
Maggea	0·45	0·57	1·73	10·02
Copeville	0·33	0·73	2·06	11·51
Claypans	0·51	0·60	1·66	10·53
Meribah	0·19	0·64	1·36	11·11
Alawoona	0·59	0·61	1·91	10·26
Caliph	0·52	0·41	1·75	10·44
Mindarie	0·59	0·62	1·82	12·13
Sandalwood	0·60	0·67	2·06	13·60
Karoonda	0·53	0·76	2·09	14·18
Pinnaroo	0·14	0·91	1·52	14·19
Parilla	0·49	0·70	1·96	13·64
Lameroo	0·50	0·77	1·84	15·79
Parrakie	0·42	0·72	1·65	14·61
Geranium	0·63	0·70	2·08	16·39
Peake	1·08	0·83	2·94	15·95
Cooke's Plains	0·31	0·63	2·30	15·29
Coomandook	0·32	0·65	2·06	17·03
Coonalpyn	0·21	0·62	2·06	17·65
Tintinara	0·34	0·79	2·50	18·72
Keith	0·61	0·90	2·49	17·96
Bordertown	0·94	0·76	3·34	19·14
Wolseley	0·77	0·74	2·60	18·47
Frances	0·62	0·76	2·93	20·12
Naracoorte	0·79	0·73	2·98	22·65
Penola	0·63	0·85	3·26	25·94
Lucindale	0·61	0·67	3·90	23·47
Kingston	0·23	0·68	2·33	24·24
Robe	0·37	0·73	2·08	24·65
Beachport	0·56	0·89	2·88	27·07
Millicent	0·85	1·01	3·84	29·87
Kalangadoo	0·46	1·34	3·76	32·05
Mount Gambier	0·55	1·04	2·74	30·34

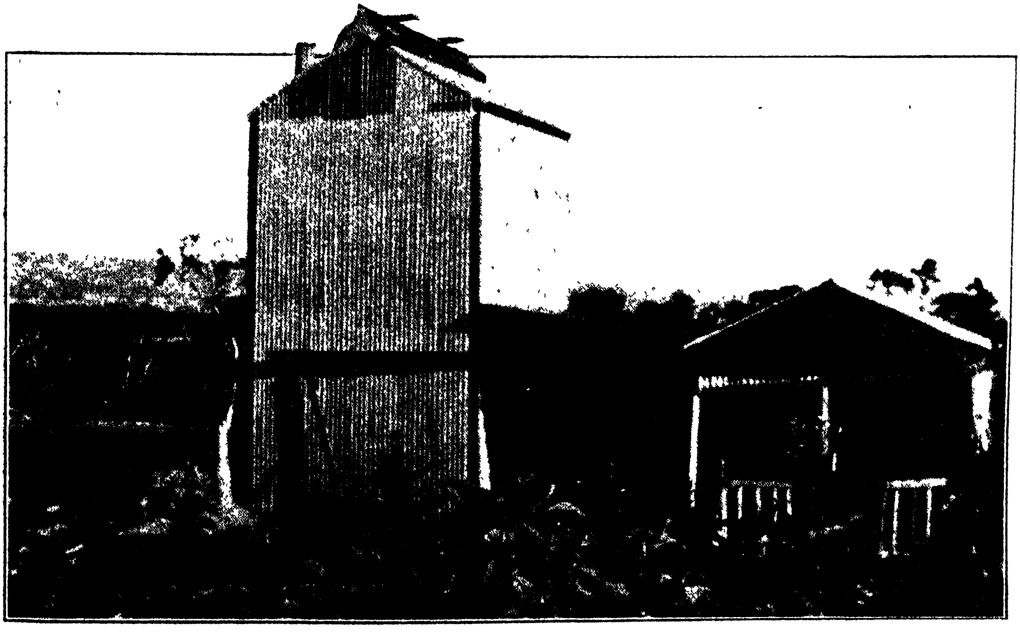
Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Adelaide—8th October, 12th November, 10th December, addresses; Appila—5th February, harvest reports; Blyth—15th January, address, R. D. Nicholls, M.P.; Balumbah—11th February, discussion; Baroota—8th February, harvest reports; Blackheath—28th January, discussion; Cambrai—3rd February, address, R. Hill; Inman Valley—18th February, "Lessons from 1936"; Karte—4th November, formal; Kelly—6th February, "Soils," H. D. Adams; Koonunga—18th December, discussion, 27th January, "Surplus Fruit," F. H. Schulz; Light's Pass—25th January, "Agriculture in Queensland," Reverend Reuter; McLaren Flat—28th January, Question Box and paper; Mount Pleasant—6th February, paper, 3rd February, address, M. W. Aird; Murraminga—6th February, discussion; Nantawarra—21st January, paper; Narridy—6th February, harvest reports; Parrakie, 19th February, annual meeting; Poochera, 28th January, re-organisation of Branch; Red Hill—16th February, discussion; Rendlesham—10th February, discussion; Robe—12th February, "New Zealand," R. C. Scott; South Kilkerran—1st February, "Crutching," G. H. Bittner; Tantanoola—12th December, discussion, tour of District, 6th February, discussion; Truro—15th February, harvest reports; Williamstown—28th January, "Dried Fruits Industry," J. B. Harris; Wilmington—9th February, harvest reports; Yandiah—12th February, harvest reports.

Field Day at Blewett Springs.

At Blewett Springs, tucked away in the hills to the north-east of McLaren Vale, is a small community of vinegrowers and orchardists who recently formed a Branch of the Agricultural Bureau, and on 23rd February they held their first Field Day. Although the attendance was not large,



Mr. G. Dowdell's Tobacco Curing Barn.

those who accompanied Messrs. R. E. C. Giles (Tobacco Instructor), H. H. Orchard (District Horticultural Adviser), and F. C. Richards (Assistant Secretary of the Agricultural Bureau) on a tour of inspection of some of the properties in the district agreed that the day had been interesting and instructive. How difficult it is to assess the fertility of the soil in the southern districts of the State was very forcibly demonstrated during the day. A casual inspection of the land over which the party toured would immediately lead one to the conclusion that its fertility is very low, yet evidence was not lacking to show what can be produced once the scrub and undergrowth have been removed. The first property inspected was that of Mr. W. Mobsby, a returned soldier settler who has a 40-acre block, 22 acres of which are planted with wine grapes and currants, 6 acres of stone fruits, and the balance—except 2 acres of scrub—under Subterranean clover. Mr. Mobsby said he had a heavy crop of D'Agen prunes, but the sample was somewhat on the small side. Parrots and other small birds had done a good deal of damage. With Mr. Orchard members discussed the pruning of the vines and Mr. Mobsby said that since he had cut the Shiraz back to two rods his crop had increased until he had been able to average 2 tons to the acre. The Mataro vines showed considerable evidence of sun scald, and Mr. Orchard thought a mistake had been made in training the vines too close to ground level, whereby the bunches of fruit were scorched by the reflected heat from the white sand. One disability of the district Mr. Mobsby said was that the land became so wet in winter that it was almost impossible to get on it, and in summer it dried out too quickly.

Crop of Tobacco—Mr. G. Dowdell's property, Blewett Springs

Mr. S. DuBois (Chairman of the Branch), whose block was next inspected, expressed the view that the cultivator must be kept going to retain the moisture in the light soils. Mr. DuBois took up a scrub block 15 years ago, and related some interesting experiences of the hard work involved in clearing the land. Some idea of the size of the timber, he said, could be gained from the fact that one tree that was felled, cut 420 vine trellis posts and provided enough material to timber a 20ft. well. Like Mr. Mobsby, he reported a very heavy crop of prunes, but the apricots were most disappointing. Acting on the advice of Mr. Orchard, Mr. DuBois had summer pruned his apricot trees and they were now showing prospects for an excellent crop next year. The setting of wine grapes, and especially Shiraz, was particularly good. Mr. DuBois was able to pass on to other members of the Bureau a valuable hint which he had had from Mr. J. Rankine, a grower of prunes in the Strathalbyn district. Practically every prune grower experiences trouble with mould development when the prunes are put out on trays in the sun. If the prunes are sprayed with a solution of 4ozs. of chloris in 1gall. of water it will be almost 100 per cent. effective in arresting the trouble. Another interesting point gleaned from Mr. DuBois was the fact that he had sulphured his vines five times. He believes that this practice has a marked influence on the setting and quality of the fruit.

Afternoon tea was provided by the wives of members, and the party moved on to Mr. G. Dowdell's property. He, too, is one of the original settlers of the district, and, in addition to 7 acres of currants and 3 acres of wine grapes and stone fruits, has, in conjunction with Mr. R. Guthrie, taken on tobacco growing. Last year he had half an acre under this crop; this year he has 5, and for the 1937 planting intends to prepare 10 acres for tobacco. Mr. Giles said the top grades of Mr. Dowdell's tobacco were equal to any that he had seen in South Australia this year. Mr. Dowdell is very much impressed with the possibilities of tobacco growing in the Blewett Springs district, and he believes that the early success that he has obtained will induce other settlers to follow his lead. At the time of the inspection the curing barn which Mr. Dowdell has erected was full of leaf and next year he proposes to erect another barn in order to handle the leaf expeditiously. Curing is perhaps the most important part in the production of the crop, for it will largely govern the price that the grower is paid for the leaf. It is a 24 hours a day job; everything depends on keeping the temperatures at the correct degree. An examination of the thermometers inside the barn is necessary every half hour. If the heat is allowed to rise too high, the leaf will dry out too rapidly; on the other hand, if it falls too low, the leaf will "sponge" with excess moisture. Mr. Dowdell spoke in high terms of the assistance and advice that he had received from Mr. Giles, and said "growers in South Australia are indeed fortunate in having at their disposal the services of a man who knows how to handle this tricky crop."

Harvest Reports.

The Chief subjects of Bureau meetings at this season of the year are the reports on harvest results supplied by individual members. The following extracts from Branch reports are published in the hope that they may be of interest to growers situated in districts where conditions are similar to those of the Branches mentioned.

KILKERRAN.—Average returns were very disappointing. The lighter soil in the western portion of the district averaged between 6 to 7bush. of wheat and about 8bush. of barley. On the eastern portion the average was 4 bags for wheat and 5 bags for barley. In each case the returns were less than 50 per cent. of the average of previous years. Diseases were more prevalent than usual, Flying Smut being particularly bad and more or less affecting every crop in the district. One member reported Bunt in Dan Wheat and another stated that Haydie had been very prevalent in Sword wheat.

BLACK SPRINGS.—By all reports the harvest yielded very favourably as compared with the outlook in spring. Dundee seemed to be the most favoured variety, followed closely by Gallipoli.

WHITWARTA.—Crops were very light, although early crops yielded much better than late ones. Mustard was the most prominent weed, especially in late crops.

BOOLEROO CENTRE.—*T. H. Borgas*: Late sown crops were easily the best. Diseases were more prevalent than for several years, Ghurka being the most affected and Sword the least. The average of 15bush. was 4bush. less than the previous season. *F. Walladge*: 45 per cent. super and sulphate of ammonia were tested on a crop of oats. Owing to the dry conditions the super proved the best. During the month of August the sheep were grazed on a paddock of wheat during the daytime only, and from that paddock an average of 7½ bags was secured. Sword averaged 19bush. and was very subject to Haydie, Ranee averaged 22bush., and Carawa only 13bush.

Flying Smut and Haydie were in evidence. The rainfall during the growing period was 820 points. *F. H. Reichstein*: The year had been a disastrous one in a dry area. Wheat sown dry had proved the best. Dundee, averaging 10bush., was the most successful wheat sown. The dry sown had averaged 2 to 3bush. better than the wet sown. The sample was again very good. Sword had proved too soft for the drier areas; Ranee and Dundee were much better. It seemed strange that the land which had been worked most and received most attention had given the poorest results. During the growing period 450 points of rain had fallen and the average was 5½bush. per acre.

MILTALIE.—The Chairman reported that one fallow paddock of Waratah had yielded very well, averaging 7 to 8 bags, while another paddock of Sword similarly cultivated, yielded only 3 bags. *J. P. Story*: A field of Sword and Ranee varieties averaged 18bush., the Sword weighing 65¾lbs. per bushel. He favoured ploughing fallow twice with a disc plough in order to make it friable. *H. Ramsey*: Land had been fallowed early and worked well, but owing to dry conditions during September, the yield was only 8bush. Mr. W. G. Smith's Ranee 4H and Waratah yielded very well; Sword was not so good. He favoured shallow fallowing, keeping the land worked evenly.

GOODE.—*C. P. Linke*: Crops had yielded very little; indeed many farmers were unable to reap sufficient for seed. His best yielding wheat was Ranee (4bush.), Quality being next with a return of 3bush *J. Backshall*: Best yield had been from Waratah and Wagga varieties. *J. Paech*: Gluford gave the best return. His fallow had showed up particularly well. He advised farmers to do more fallowing, provided their land was not inclined to drift. Many members had good results from Ranee and Gluford, and considered that they were two of the most suitable wheats for the district.

HILLTOWN.—Wild oats had been prevalent in most crops. Their presence was considered to be due to seasonal conditions. Crops generally had yielded up to expectations, although the average yield was below normal. Several crops of 30bush. or more were reported. Harvesting weather was abnormal, but no serious loss or damage was experienced.

BEETALOO VALLEY.—Hay cuts were lighter than usual, and more wild oats were present. The average cut was 25cwts. Wheat yields averaged 20 to 25bush. Ranee appeared to be the most popular wheat, and produced the highest yields. Nabawa and Bencubbin were next in order of popularity.

PASKEVILLE.—Due to lack of moisture during the growing period, wheat and barley crops were light. Yields varied from 2 to 16bush. per acre. Among the best varieties were Bencubbin, Sword, Ranee, Aussie and Dundee. Hay crops were very light, and difficulty was experienced in getting sufficient for local requirements. Chaff carriers of various designs were used in order to save as much chaff as possible. The sample was generally good, barley samples also were rather better than the average. Oat crops were practically a failure, very few growing high enough to cut for hay or to strip for grain.

WEAVERS.—*K. H. Giles*: Wheat did not stool very well, but yielded well in proportion. Ranee contained much Red Rust on the flag, although it did not affect the grain. Dundee had given the best yield. *E. H. Giles*: Challenge Barley yielded about 30bush., while Plumage Archer returned only about 22bush. *H. W. Cornish*: Wheat on grassland yielded better than on fallow and was a cleaner crop. Barley sown with a bag of super per acre had yielded better than that sown with 90lbs. *W. G. Agnew*: Barley had yielded well on land which had been cultivated only, and not ploughed at all. It had been too dry for wheat on grassland on their property. Bobbin and Bencubbin on fallow had gone off somewhat. *L. S. Arthur*: Crops were light but with good rain. Ranee on fallow had made a good crop, though mostly cut for hay. He recommended Gluyas as a suitable grassland wheat. Oats had been stunted by the dry spring.

APPILA: Paddocks sown dry or soon after the rains had shown an abundance of wild oats, while crops sown a few weeks later were practically free of them. Germination was good, but through lack of rain growth was not satisfactory. In most cases yields were above expectations, although returns were below average. Yields were:—Early African, 9 to 15bush.; Ranee 4H, 6 to 19bush.; Dundee, 9 to 18bush.; King's Early, 12 to 15bush.; Nabawa, 11 to 16bush.; Leatherhead, 6 to 18bush.; Baldmin, 9 to 11bush.; Minister, 6bush.; S.H.J. 13bush.; Sword, 7 to 12bush.; Turvey, 16bush.; Ghurka, 10 to 15bush.; Currawa, 12bush.; Crosstan, 14 bush.; Canaan, 13bush.; Waratah, 8 to 14bush.; Fondling, 8 to 12bush.; Oats, 1 to 15bush.; Barley, 5 to 14 bags.

TRURO.—The season had been dry and adverse although rains during October enabled the grain to fill out nicely, augmenting the yield and giving satisfactory grain returns. Haycuts were lighter and short of growth. Varieties of wheat sown were Ranee 4H, Dundee, Sword, Waratah, Dan, Free Gallipoli, Ghurka and Leak's Rustproof, averaging from 4 to 9 bags on fallow and 6 to 11bush. on stubble. Oats sown were Lachlan, Algerian and Mulga, averaging 5 to 14 bags per acre. Barley yielded up to 11 bags.

Candying Fruits.

Asked by the McLaren Flat Branch of the Agricultural Bureau for instructions for candying fruits, Mr. H. H. Orchard (District Horticultural Adviser) says:—

The chief art in candying and crystallising fruit is to see that the syrup is brought to the proper consistency. In two or three minutes a syrup over a fire passes from one degree to another. Of these degrees there are seven, but it is on these degrees that the whole success of candying turns.

The first degree is the lisse or thread, and as this is the one that we are mostly concerned with, the process is explained. Take a pound of the best loaf sugar and put it in a vessel. Over this pour ½ pint of spring water. Boil it in a brass or copper pan over a sharp fire, removing all scum as it rises to the surface. Test it by dipping the forefinger of the right hand first into cold water and then into the boiling sugar. Dip it back at once into cold water to prevent the finger being burnt, but immediately withdraw it from the water before the sugar has time to drop off. Pinch the sugar between the finger and thumb, and on slightly separating, a thread is formed, which, after being pulled to a certain length, will snap. This then, is the first degree of syrup, or the thread.

To Candy.—Greengages apricots, plums and cherries are delicious when successfully prepared in this manner, but it is a long business, and requires great care. Split the fruits and remove the stones. Lay the fruits carefully into the prepared syrup, and boil them slowly until they become

McLaren Flat Branch conducted a successful Field Day on 18th December.

clear. Remove any scum that arises. Lift the fruits out one by one with a skimmer, and lay on flat dishes in a perfectly dry place. Cover over for 24 hours. Have the syrup again ready. It should now have been cooked to its second degree or pearl. This is then tested in the same manner. If found that on drawing out to a thread it snaps quickly, and also that when boiling the sugar presents the form of large pearls or globules on the surface, it will have reached the pearl stage. Into this lay the fruit as before, and boil gently until quite tender. Put on a flat dish again and leave for another 24 hours. The fruit is again laid in the syrup and boiled for another few minutes. Have ready some of the best castor sugar and sift it over the fruit on all sides until quite white. Lay the fruit on the shallow end of a clean and perfectly dry sieve (wire trays are excellent for this purpose), and place the sieves or trays in a moderately warm oven. The oven must not be allowed to get cold until all the fruit is quite dry. Watch the fruit carefully, and turn over two or three times. When dry, it is finished. All fruit thus preserved should be kept in a dry place.

Strawberry Culture.

[By W. R Parmenter,
Williamstown Branch.]

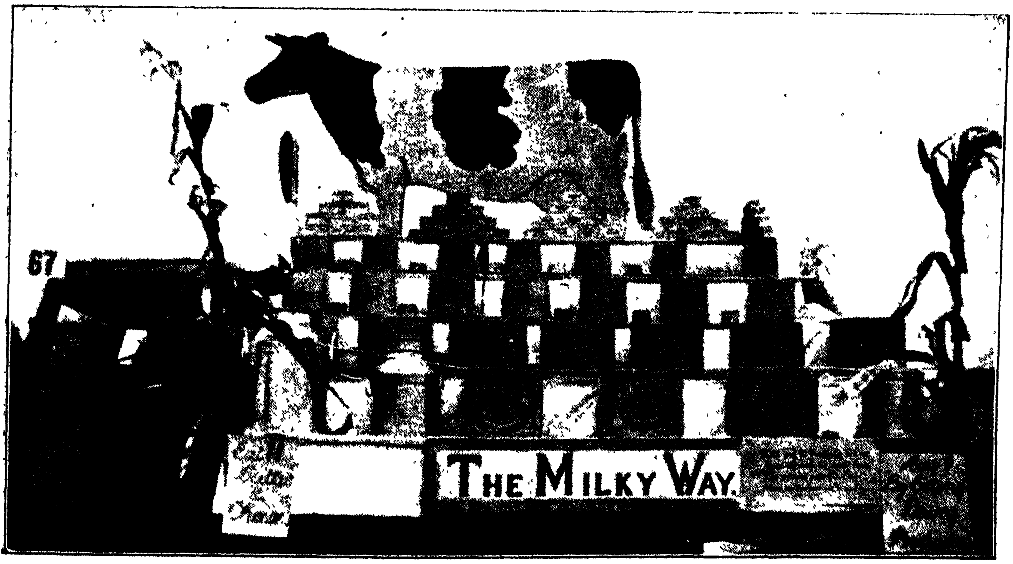
Strawberries "Ettersburg 89" grown by Mr. W. R. Parmenter, Williamstown.

The best soil in which to grow strawberries is a good loam with a clay or slate subsoil, although they will grow on almost any class of soil. In South Australia the strawberry is chiefly grown in the Mount Lofty Ranges, where a good rainfall is generally obtained, but they will also do very well in the drier districts. Where a rainfall from 16in. upwards is to be obtained, strawberries can be successfully grown, provided that the proper attention is given. The best way to grow them is to get good well-rooted runners, and these can be set out in rows, beds, or in hills. To plant in rows, the plants are set from 12 to 18in. apart in the row, and the rows 24 to 30in. apart. Any runners forming between the plants are allowed to remain, whilst any that form between the rows are kept cut off; this will eventually form a matted row of plants. To plant in beds, the rows are set a little closer and all runners allowed to remain, eventually forming a matted bed of plants. To plant in hills, plant the same as for rows, but all runners are kept cut off, and the original plant will branch out into a number of crowns, from which they will flower and fruit in great numbers. To plant the runners, only the roots should be put in the soil, and not the corm from which the crowns form. The strawberry has a peculiarity in its flowers, and can be placed in three groups, namely, Pistillate, Staminate and Hermaphrodites. In the Pistillate group the flowers are so defective in their stamens that they need the fertilising influence of another variety planted near them to ensure the crop setting. In the Staminates group, the flowers are often so defective in their pistils that a great percentage fall off or fail to set fruit. This is more often the case when these varieties are grown in beds, and the runners allowed to stay on, but they are usually very productive if grown in hills. In the Hermaphrodite group the two sexes are so evenly combined that almost every flower sets perfect fruit, but only a few varieties belong to this group. The best time to plant out strawberries is from May to July, when the runners have attained a suitable size. However, the earlier the plants are set out the better, because they can then produce sufficient growth before they fruit to carry a crop of good berries. Should the plants not be growing sufficient foliage, all flowers that form by the end of August should be picked off. This will help the plant to grow foliage, and the flowers will grow later. Some gardeners make the mistake of manuring too heavily. This only tends to grow foliage and very little fruit sets, the plants usually growing all runners and no fruit. The best method of manuring is to dig in plenty of green manure in the winter, and give a dressing of super and bone dust (2cwts. to the acre), and when the fruit has set give a dressing of sulphate of ammonia (1cwt. per acre). A good plan is to mulch the plants in the winter with old stable manure, straw or sawdust; when the rains come, the manure will be carried into the soil as liquid manure.

Some gardeners make a mistake by watering their strawberries and by stopping the watering when the crop has finished. Strawberries can be successfully grown without the aid of irrigation in any district where a rainfall of 25in. or more is obtained. It is only in the drier districts where irrigation, either by the use of sprinklers or by flooding the ground, should be used.

The strawberry is only a shallow-rooted plant, and produces a number of surface roots to feed the moisture required by the plant; should irrigation be applied, the plant must produce more surface roots to help feed the extra moisture into the plant. Should the irrigation be discontinued in the drier months of the year, the plant cannot find enough moisture to carry the increase in roots and foliage, and it generally deteriorates or dies. Some of the chief causes of failure with strawberries are the numerous pests and diseases that occur at different times. Insects and grubs are more destructive than any disease that has yet appeared in a strawberry garden. The Green Fly, or Aphis as it is generally known, often attacks the roots of the plants, particularly when the soil is loose so as to admit them readily to the roots. The snail and the slug are also destructive and destroy fruit in large quantities. The Rutherglen Bug is also a destructive pest, as it sucks the juice from the berries, making them useless for market.

Strawberry Leaf Spot is a fungus disease to be found in almost every garden. It causes numerous brown spots to appear on



"Milk Float," prepared by Mr. W. H. Downes (District Dairy Instructor), for the Pageant of Progress, Mount Gambier Centenary Celebrations, 1937.

the leaves of the plants. Mildew is a disease to be found in the wetter districts, or where irrigation is used. The reason why it is better to plant good strong runners is that should the old bushes have a disease, it will not be spread by using strong, healthy runners. Some growers split up their old plants when replanting, using a piece containing good roots and a crown for fruit. Strawberries properly cared for will bear for a number of years, but it is advisable to try and keep only young plants, or re-plant every three years. When planting for market purposes, it is advisable to plant every year, and at the end of three years dig up a bed and re-plant again. There are a great number of varieties to choose from, but the ones usually grown are Melba, Hackett's Giant, Gandy, Ettersburg 89, Rhodes Special and Royal Sovereign.

The strawberry begins to ripen at the end of September, and will continue to bear until December. Should conditions be suitable, such as if sufficient moisture can be obtained during the summer, a second and often a third crop can be gathered. This is more often noticed where the strawberry is grown with the aid of irrigation, and if irrigation can be used without too much expense attached to it, I would advise its use only for this purpose.

Activities of Women's Branches

BALHANNAH.

Mrs. Norsworthy presided at the meeting held on 20th January, which was attended by 26 members and 11 visitors. Mrs. Lawrence gave an interesting address, "A Trip Through Holland." (Secretary, Mrs. P. Grow.)

BELALIE.

Twenty-six members were present at the December meeting. The Secretary (Mrs. E. L. Orchard) reported that books and magazines had been sent to "out-back" Branches. Mrs. J. Murchland spoke on "Books and Magazines as Christmas Gifts," and exhibited samples, illustrating the methods of wrapping and tying the parcels. A competition conducted by the Branch resulted in the following awards: —Afternoon tea dainties, Mrs. Sandercock; miniature rock garden, Mrs. Avery; collection of needlework, Mrs. Orchard.

Drying Prunes.

Belalie Women held their monthly meeting on the 9th March, 60 members being present including 29 members from Wirrabara. Mrs. Watt read the following paper:—

Prunes, like raisins, dates and nuts are very nutritious. The best time for gathering the fresh fruit for drying is when it is "dead" ripe. More depends on the ripeness of the fruit and the variety than in the actual dipping and drying.

The smaller class of prune is the better variety for drying. Prune D'Argent and Prune Splendour are considered the best for that purpose.

Prunes must always be dipped in lye for good results. To do it in a small way at home, use a copper for the purpose. Use about 8 gallons of water, putting in enough caustic soda to cause minute cracks to appear on the fruit after it has been dipped for a short time. Do not put in enough to cause the skin to break and peel off when touched. Add to this mixture when boiling ½ to 1 cup of liquid paraffin. This gives the fruit a glossy skin when dried and greatly adds to the appearance. Not only does it gloss them, but causes the fruit to be less likely to become infested with grubs.

If the weather is warm, about 3 days will be sufficient to dry the prunes. From ½ case of fresh prunes I obtained 17lbs. of dried fruit.

PRUNE PULP.—Wash prunes well, soak overnight, boil 1 hour and strain, then remove stones and press through sieve, add a little juice. Thirteen prunes make about 7 teaspoons of pulp.

PRUNE JELLY, *an Invalid Dish.*—½lb. prunes, 2oz. sugar, ½pt. water, ½ lemon rind, ½oz. gelatine. Wash the prunes in cold water and leave soaking for several hours in ½pt. water. Put into saucepan with lemon rind and sugar and cook until tender. Soak gelatine in 2 tablespoons of prune juice, keeping warm all the time. Press the prunes together with syrup through sieve, add gelatine, and mix well, put into moulds and serve when cold with cream.

Stoned prunes are delicious done up like date creams. Prunes are very nice for cakes and can be used instead of dates and raisins. Whenever cooking prunes, always place a lemon rind in whilst cooking. It improves the flavour.

Apples and Their Uses.

Mrs. M. Francis read the following paper:—

Apples are used extensively in most homes, especially at this time of the year when they are so plentiful and cheap, and as good apples possess valuable properties, their medicinal value cannot be overestimated. A piece of raw apple at the end of a meal is excellent for removing all particles of food from the teeth. An apple eaten slowly last thing at night is said to be soothing to the nerves, and induces sleep.

Fruit is especially necessary to children, but they soon tire of it cooked in the same way, but if served in a new attractive way, will eat it readily. Baked apples stuffed with nuts, raisins or dates, and sprinkled with sugar and cinnamon, or cocoanuts, or stewed apples covered with stiffly beaten egg whites and served with whipped cream all make for variety.

Apple Jelly.—Wash apples, cut up roughly without peeling. Put into preserving pan, and cover with water, cook until soft, strain through cheesecloth and measure liquid, allowing 1 cup of sugar to cup of liquid. Bring to boil when sugar is dissolved, and boil quickly, removing scum as it rises. Test a little on saucer at intervals, and as soon as it jells, remove from fire. Bottle while hot, a few cloves or ginger may be added to apples if liked. Allow 1 large lemon to each 12lbs. fruit.

Apple Tarts.—Line patty pans with short pastry. Peel and core 3 or 4 large cooking apples, and slice thinly, put a layer of apple on pastry, then a few currants, and squeeze of lemon, sprinkle with sugar, then add more apple and sugar, cover with pastry and prick over with fork. Brush over with water and sprinkle with castor sugar. Bake for ½ an hour in moderate oven.

Apple Fritters.—Peel and core 5 or 6 apples and cut into rings. Grate some lemon peel and mix with moist sugar. Roll each ring in this first then dip in batter and fry in lard for about 10 minutes. When nicely browned, drain and sprinkle with castor sugar. Serve very hot. For the batter, 1 egg well beaten, ½ pint milk, 2 tbspns. flour, mix well.

Apple and Almond Charlotte.—Butter a piedish, sprinkle it with sugar and chopped almonds. Cover these with slices of bread moistened with milk, almost fill pie-dish with sliced apples, and sprinkle with sugar and almonds, cover again with bread moistened with milk, a few small pieces of butter, sprinkle of sugar. Can be served hot or cold. To be baked one hour.

Apple Rolls.—Stew some apples very dry. Roll short crust fairly thin, and cut into strips, spread apple on and roll over, same as for meat rolls. Bake in a quick oven. When almost cold, ice with pink icing and sprinkle with cocoanut.

Apple and Lemon Tart.—One lemon, 1 large apple, 1 egg, 1 small cup sugar. Peel, core and cut apple very small, or grate on medium grater, slice lemon very finely, beat egg and sugar well, then add apple and lemon; line tart dish with short pastry and put in mixture; bake in moderate oven, cover if getting too brown as it burns very quickly. Serve with cream.

Apple Moulds.—Boil 6 apples fairly dry, mash them well, add 1oz. butter, pinch of salt, 1 cup of breadcrumbs, 2 eggs well beaten, and ½ cup of milk, a little nutmeg or cinnamon. Mix well, put into wetted moulds, and bake ½ hour. Turn out and sprinkle with sugar and cocoanut.

Apple Pink.—Peel and core 6 large apples, put them in pie dish, sprinkle well with sugar, the grated peel of ½ lemon, and 1 pint of water coloured with cochineal. Cook in oven until apples are tender, place apples in glass dish and boil liquid until it is a thick syrup. When cold pour over apples and serve with whipped cream.

Apple Sauce.—Cook 3 medium-sized apples with 1 tbspn. of water until tender, mash with fork, then add 2 tbspns. sugar, 1 tspn. salt, a little pepper, a little mustard mixed with 2 tbspn. vinegar; mix well, this is very nice with pork.

Apple Filling.—Bake 4 large cooking apples, take out pulp and mix in a bowl with juice of orange or lemon, and a little grated peel, ½ cup sugar, 2 tbspns. melted butter, 2 tbspns. honey, beat well and put in covered pots. This makes a nice filling for sandwiches.

APPLE SHORTCAKE.—1lb. self-raising flour, ½lb. butter, ¼lb. sugar, 2 eggs, 4 tblspns. milk, 2lbs. stewed apples (dry and cooled). Beat butter and sugar to a cream, add eggs and milk, beat well, sift in flour, mix into rather soft paste. Divide in half, put half in a greased tin, then spread with the apples, roll out other half paste and cover apples. Bake in moderate oven ½ an hour. Sprinkle with butter, sugar and cinnamon and return to oven for 5 minutes. When cold cut in squares.

APPLE CREAM CAKE.—Work together 1 cup self-raising flour, ½ cup of butter, ½ cup brown sugar, 1 egg pinch salt. When all are well blended, mould on a board, cut in three parts, roll each part to fill a pie plate, bake in slow oven to light brown. Cook apples very dry and tender, mash with a little sugar and cinnamon and spread thickly between layers of cake. Cover top of cake with whipped cream, letting cream run over sides until cake is completely covered.

Apples can also be dried very easily. Peel, core and slice and drop into salted water (about 2galls. water, 1 cup salt), drain and place on trays in sun.

Secretary, Mrs. E. L. Orchard.

CLARE.

The 7th November meeting was held at the residence of Mrs. Blight. There was an excellent attendance—30 members and 8 visitors, including members from the Belalie Branch. Reports of the Congress delegates were received and discussed.

Forty-five members and 18 visitors were present at the final meeting for the year on 5th December, which took the form of a social afternoon. Parcels of books, etc., have been forwarded to outlying Branches. (Secretary, Mrs. A. Pollock).

GLADSTONE.

During January members of the Branch visited Laura, and were shown over the local ice works by the manager (Mr. Boucaut). (Secretary, Mrs. L. J. Sargent.)

KYBYBOLITE.

Mrs. H. Schinckel occupied the chair at the meeting held on 22nd December, which was attended by 16 members and visitors. Christmas recipes were discussed and exchanged. (Secretary, Mrs. W. Kekwick.)

LAURA BAY.

Household Hints.

The January meeting was held at the residence of Mrs. W. Bowell. The Secretary (Miss L. Blumson) read the following paper:—

To get rid of silverfish, sprinkle powdered alum in all crevices where they harbour, and paint the inside of drawers, etc., with a strong solution of alum.

Always put alum in paste for papering, or pasting the back of pictures. Epsom salts is also very good sprinkled in cupboards and along skirting boards.

When washing linoleum add any unused boiled starch to the water, which makes a good shine.

A pinch of soda in blacklead and mixed with vinegar makes a nice polish, or methylated spirits, preferably used when stove is cold. Rub the top of the stove with a piece of lemon before polishing, and the polish will last much longer.

For hives, makes a paste of carbonate soda and cold water, and dab it on.

When windows are difficult to open, rub the cords with soft soap, and the sashes will run smoothly.

To cook red beet, peel and cut when raw, and put in saucepan, with a little water, and cook gently. When cooked, add vinegar to the water it was cooked in. The beet has a delicious flavour done this way, and a beautiful red colour.

The water in which rice is boiled makes an excellent starch if 2 or 3 drops of turpentine are added.

To remove brands from a flour bag, before washing, wet well with kerosene and rub with the hands until brands are out. Wash in hot water and soap, rub again. Wash out all kerosene, and boil.

Powder baby less when changing, and use vaseline (white for preference). It is waterproof, and less liable to cause scalding.

New stockings will last a long time without wearing into holes if they are shrunk before being worn.

Cold tea leaves bound on a burn relieve it at once.

Rub lamp glasses with salt after cleaning them, and a much better light will be given.

Whisky will take out many fruit stains. Before washing, dip the stain in the raw spirits, and let it dry.

When glazed covering begins to come off the heels of black patent shoes, pull it all off, and give heels a coat of black enamel paint.

Scald saucepans with boiling water before boiling milk for custard, and it will not burn.

Always turn the saucepan in which milk has been boiled upside down, and it will be as easy to wash as if it had been soaked.

When making a baked custard, stand the piedish in a baking dish of hot water in the oven, and it will prevent the custard from going watery.

MILANG.

Eleven members and five visitors attended the meeting held on 15th January, when an instructive paper, "First Aid," was read by Miss V. Pearce. Two new members were enrolled. A demonstration of bandaging was given by Miss J. Pearce. (Secretary, Miss R. Whitfield.)

MILLICENT.

The first meeting of the year was held on 15th January and was attended by 13 members and visitors. Gifts were brought for sale and the proceeds will be devoted to the Opportunity Fund. (Secretary, Miss K. Hutchesson.)

MONARTO SOUTH.

The subject of the January meeting was a Fancy Cake Competition, a condition of which was that all cakes should be made from the same recipe. The judges (Mrs. F. Liebelt, secretary, and Miss S. Schenscher) made the following awards:—First prize, Miss E. Hein; second prize, Mrs. H. White.

MYPONGA.

A combined meeting of the Men's and Women's Branches was held on 21st January. Addresses were given by Messrs. Osborne, Leader, and Simpson on the marketing and testing of eggs. (Secretary, Mrs. M. Bounds.)

PARILLA.

Members met on 16th December at the residence of Mrs. Foale. The meeting took the form of a social afternoon with a competition for the most suitable article for a Christmas gift not to cost more than 3s. Miss Foale, Mrs. Cheney, and Miss Carman were the prize winners. (Secretary, Mrs. R. Welden.)

SHEOAK LOG.

Twenty-seven members were present at the January meeting. Miss Barnett gave a travel talk of countries she had visited during a recent trip to Europe. Parcels of magazines were forwarded to "outback" Branches. (Secretary, Miss K. Koch.)

SMITHVILLE.

Gardens and Rockeries.

The following paper was read by Mrs. S. Pillar at a recent meeting of the Branch:—

"Every man and woman should have a hobby, and gardening, whether considered from the point of the general utility vegetable patch or the attractive flower pot, is one of the most delightful hobbies anyone can choose. It is not an expensive hobby, and is quite within the reach of the average pocket.

The annuals embrace some of the showiest of garden plants. Annuals are plants which live and bloom only one season, and require to be sown each year; but, in proportion to cost and care, no class of plants gives the same amount of pleasure. They will grow in almost any soil, but to have fine blooms the soil should be free and good. If the soil is dry, give the ground a soaking the day before sowing, which should be done on a fine, cool day. Success in growing annuals depends largely on giving the plant plenty of room. If too crowded, the plants suffer, and the size and number of flowers and the general effect are decreased.

There are also quite a number of beautiful perennials well worth growing. Perennials are those which live for more than two years, and when once established continue to grow and bloom annually. They usually commence flowering the following year after being sown, but many varieties will flower the first year if sown early. They are quite a good plant to have in a garden, as once they have finished flowering they can be cut back, and they come up quite fresh next season. Some of the varieties worth growing, and which take very little attention, are chrysanthemums, aquilegias, delphiniums, antirrhinums, verbenas, &c.

No garden is complete without roses, either standard, climbing or dwarf. They bloom for many years, and need very little attention other than pruning, watering, and manuring.

ROCKERIES.

Just at the present rockeries are very popular. The first thing to do in planning for a rockery is to choose a suitable site, mark out on the ground the area it is to cover, then dig over the space as one would do in preparing for an ordinary garden. When this has been done, then comes the question of the stones to be used. As far as we are concerned in this district, there should be no mounded-up appearance about the rock arrangement. Begin building by choosing the largest stones, and place them where they will be effective. Avoid propping them up on end; fix them solidly in the soil, and place them as they would fall if Nature had placed them there. When building is completed, the next process is planting. There are quite a lot of rockery plants that are very easy to grow, and are very pretty. One can have a rockery where it would be almost impossible to have a garden, as it does not take a lot of attention and water, and the plants seem to be very hardy. The best effects will be obtained from a rockery that has a suitable background, may be a group of shrubs, a wall or hedge, or a fence clothed with climbing plants of some kind.

While the flower garden and the rockery are very beautiful and interesting, we must not lose sight of the vegetable patch, which is very necessary and useful. How nice it is to be able to go into the garden and pick fresh vegetables—such a different flavour to those purchased from a shop!

A salad is an adjunct to a dinner, more especially in the hot weather, and makes the meal more attractive.

It does not matter how beautiful a home may be in appearance, both inside and out, there is something lacking if there is no garden around it, and no flowers to brighten the individual rooms; and, after all, it is as easy, with a little time and attention, to grow flowers." (Secretary, Mrs. C. Walker, Wilkawatt.)

JOURNAL
OF THE
Department of Agriculture
OF
South Australia

VOL. XL. APRIL, 1937. No. 9

Published Monthly by the Department of Agriculture Edited by H. C. PRITCHARD

Page

Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836-1936 685-692
Silver Leaf Diseases in Orchard Trees 693-695
Review of the Present Fruit Season on the Irrigation Areas .. 696-699
A Note on *Brassica Tournefortii*, Gouan.: A Cruciferous Weed New to South Australia 699
Dehorning Cattle 700-701
Papers Read at Conferences 702-715
Insects and other Invertebrates of Economic Importance in South Australia during the Period July, 1934, to June, 1936 .. 717-731
Notes on Plant Diseases in South Australia during the Two-Year Period, 30th June, 1936 732-734
Egg-Laying Competition for 1936-37 735-736
Agricultural Bureau of South Australia—Conferences 738-739
Advisory Board 740
Rainfall Table 743-744
Bureau Reports 745-750

WOMEN'S BRANCHES.

Bureau Reports 750-766

All communications to be addressed:

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1937

Dairying, at Lobethal, Thursday, 13th May (Mr. B. Schapel).

River Murray, at Waikerie, Thursday, 17th June (Mr. F. B. Harden).

Upper North, at Booleroo Centre, Wednesday, 21st July (Mr. C. J. Carey and Miss V. Keller).

Pinnaroo Line, at Lameroo, Tuesday, 3rd August (Mr. J. L. Byrne).

Murray Lands West, at Karoonda, Thursday, 5th August (Mr. W. R. Trestrail, Coomandook).

Southern, at Milang, Thursday, 19th August (Mr. L. E. Yelland and Miss Ruth Whitfield).

Murray Lands East, at Taplan, Tuesday, 28th September (Mr. G. R. Hodge and Mrs. Hodge).

Eyre's Peninsula (Lower), at Ungarra, Wednesday, 20th October (Mr. W. G. Gordon).

Eyre's Peninsula (Central), at Poochera, Friday, 22nd October (Mr. F. R. Joy).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

	London Values.					
Date of Quotation.	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	
	March.	March.	March.	Mar.-April.	May-June	
1937.	s. d.	s. d.	s. d.	s. d.	s. d.	
Mar. 18..	5 9¾	5 9	6 1¾	6 0	5 7½	Various sales—South Australian (afloat) at 5s. 9d.; Victorian, 7,400 tons (March), 5s. 9d. and 7,500 tons (April), 5s. 8⅞d.; New South Wales, 350 tons (afloat), 5s. 9d.
Mar. 24..	5 11⅝	5 11¼	6 3⅜	6 3¾	5 9¾	New South Wales, 7,200 tons (loading), 5s. 10½d., and 5,800 tons (May), 5s. 10½d.; Victorian, 8,077 tons (February), 5s. 10⅞d., and 7,500 tons (March), 5s. 10⅛d.; South Australian; 7,580 tons (March), 5s. 10½d. Plate wheat, 12,000 tons to Germany, prices not disclosed.
			April.	May-June.		
April 1	6 1½	6 1⅛	6 6	6 6⅛	6 0¾	New South Wales, 4,000 tons (afloat), 6s. 1⅞d.; South Australian, 2,000 tons (March), 6s. 1⅞d.; Western Australia, 1,500 tons (afloat), 6s. 2⅞d.
	April	May.				
April 8..	6 3⅜	6 3¾	6 7	6 7¾	6 1⅛	Victorian, 350 tons (April), 6s. 2⅝d.; South Australian, 4,500 tons (July), 5s. 11⅝d.
April 15..	6 0¾	6 0	6 3	6 5⅝	5 11¼	New South Wales, 7,400 tons (April) to Spain, price not disclosed; Victorian, 7,303 tons to Germany, price not disclosed.

THE JOURNAL

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Department of Agriculture

OF

South Australia

Vol. XL. APRIL, 1937. No. 9

Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By ARTHUR J. PERKINS, Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 611.)

THE FIRST DECADE, 1836-1846.

CHAPTER IV.

The delays to Rural settlement did not apply to the livestock industry—The "Squatters"—Regulations concerning Pastoral settlement ignored for six years—Governor Grey's address on the subject—Overseas importation of livestock and losses therefrom —Joseph Hawdon's pioneer overland journey to South Australia with a herd of cattle.

Under a regime that as a matter of principle did not admit of preselection of land before survey, as was indeed the case in South Australia—delayed surveys led automatically to corresponding postponement of rural settlement in general: but it did not follow that the same could be said of certain aspects of the development of the livestock industries. To this end it would suffice to secure official admission, however begrudging, that flocks and herds could be tended and exploited independently of ownership, or even lease of land, on the primordial principle that unallotted vacant lands were open to the flocks and herds of the community that held sway over such lands. In Holy Writ, the wandering livestock of Abraham and Lot supplied a classic example of this type of pastoral development, although doubtless the control over the land by the community to which they belonged was of the shadowyest. In those primitive times before it had been realised that the requirements of the "lean" portions of the year could as a rule be adequately met from the abundance of the "fat" portions—and one might well ask whether even in this year of grace, 1937, this principle had yet been definitely recognised?—in those primitive times there were well recognised winter and summer pastures respectively: and betwixt the twain flocks and herds travelled regularly to and fro: and in many countries—chiefly Asiatic—this custom had extended to the present day. Such indeed had always been, and still was, the normal treatment of the roaming flocks of Spanish Merinos: spreading over the plains during the winter months, climbing back to the mountains in summer, with a brief intervening stay at the foothills for shearing. Within modern times the United States of America had first grudgingly to tolerate the illegal occupation of vacant lands by so-called "Squatters," and ultimately to legalise the position of the latter: similarity in local conditions led to a similar development in New South Wales, which extended thereafter through the length and breadth of Australia.

Hence, even in South Australia—in which special precautions seemed to have been taken for its avoidance—a special phase developed in its history when "squatters," who paid neither fee-simple nor annual rent, successfully claimed quasi-ownership of vast areas of land over which their flocks and herds were allowed to roam without let or hindrance—for a long time. Nevertheless lack of title deeds and insecurity of tenure must—among other things—frequently have disturbed the sleepless nights of their owners. That—on the whole—they did not abuse their privileged position, but rather respected the rights of both the community and their "fellow squatters" was evidenced by the fact that the term "squatter," given at first in derision, as connoting a person who was taking unfair advantage of the community, came eventually to be recognised by the same community as the distinguishing title of the aristocracy of the land: and this not necessarily on the grounds of personal wealth—which in those early days made quite as strong an appeal as 100 years later—but to a very great extent on grounds of personal worth and merit. It was recorded by Leichhardt in his *Overland Expedition* that "he and his party had been received with the greatest kindness by his friends the 'Squatters,' a class principally composed of young men of good education, gentlemanly habits, and high principle, and whose unbounded hospitality and friendly assistance he had previously experienced." (¹) John Lewis, who in his earlier years had been in close contact with pioneer pastoralists, referred to them in the following terms in his 1916 Presidential Address to the Royal Geographical Society of Australasia: "the men who went in quest of new settlement were called 'squatters.' They pushed out into unknown regions and into the solitude of the Australian bush, and were to all intents and purposes the first explorers." (²)

Dr. Ludwig Leichhardt.

[*Plate* 26.]

(¹) *Overland Expedition in Australia,* by Dr. Ludwig Leichhardt, introduction pages 14 and 15.

(²) Proceedings of the Royal Geographical Society of Australia, vol. 17, page 50.

But it must not be imagined that either the British farmers who came hither, intent upon replicating as nearly as possible in South Australia, the small livestock farms of their homeland, or even the Colonisation Commissioners to whom had been entrusted the land settlement of the new province, had the slightest inkling as to the particular direction in which the main livestock industry of the colony—sheep tending—was to proceed almost from the earliest days of the colony's foundation. In the simple philosophy of the former—apart perhaps from a few, whose experience might have been confined to the moorlands or uplands of Great Britain, although of such we have no record ([3])—the tending of livestock, on the one hand, and cropping operations, on the other, were intimately interwoven, the success of the combined business being dependent upon mutual reactions, to such an extent that farmers of this type could scarce contemplate "livestock tending" without its associated crops; nor cropping without auxiliary livestock.

Hon. John Lewis, M.L.C.

[*Plate* 27.]

The Colonisation Commissioners, on the other hand, were so far from suspecting the trend of things in matters pastoral that after issuing elaborate regulations for their general control, as far back as 1835, they continued for a period of six consecutive years to amend, remodel, and furbish the original regulations at periodic intervals; blissfully ignorant the while that during the course of that period, not a single acre of pasture land had been leased, nor one shilling's worth of revenue collected; notwithstanding that flocks and herds were progressively spreading over the colony under the energetic guidance of exploring squatters. So singular a state of affairs would appear to argue very great defects in the official correspondence passing between the Adelaide Resident Commissioner and the London Colonisation Commissioners, under whose direction the former was supposed to work. Governor Grey was the first to stress the position officially in an address to the Legislative Council, on occasion of the introduction of an Act to prevent the unauthorised occupation of the unsold lands of the province—1842: and extracts which follow were taken from Governor Grey's address as reproduced in volume 17 of the proceedings of the Royal Geographical Society of Australasia.

The original regulations of June, 1835, provided among other things that "leases of the pasturage of unsold land shall be granted for terms of three years at a rent of 10s. per square mile per annum; the tenant having a right of renewal in preference to any other applicant. Such leases to be held subject to conditions which will prohibit the cultivation of the land. The land, or any portion of it, shall be liable to sale; and if sold the lease will terminate on a notice of two months. The tenant, however, will have a right of renewal to unsold portions."

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(3) It is nevertheless on record that David McLaren, commercial Manager of the South Australian Company, in his first Australian letter to London, and in many subsequent ones, pleaded with typical clannishness for "stout, active, sober, industrious men, with wives of similar character from the Highlands and Islands of Scotland. . . . But send no more Scotchmen, Englishmen, or Irishmen whose character is in any wise doubtful: and be careful as to advances, since the greatest blackguards have had the heaviest advances." David McLaren to Edmund Wheeler, 16th May, 1837.

On the 1st October, 1835, the regulations were amended, confining leases on the above conditions "to those only who are proprietors of land in the colony, and at a rate not exceeding two square miles of pasturage for every 80 acres—non-proprietors to pay a rental of £2 (instead of 10s.) per square mile per annum; the purchasers of the first 437 Land Orders to have the first choice of pasturage."

Governor Capt. Geo Grey.
(Courtesy of Archives.)
[*Plate* 28.]

The regulations were again amended on the 22nd August, 1836: but no copy of these regulations was available to Governor Grey: from subsequent correspondence, however, the amendment would appear to have provided that those purchasing land after the 31st August, 1836, would not be entitled to one square mile of pasturage for every 40 acres purchased at the yearly rent of 10s. per square mile.

On the 3rd May, 1837, the Colonisation Commissioners informed the Resident Commissioner that they had under contemplation to raise the rent of pasturage on a renewal of the leases. (It should be noted again that at that date no leases of pasture land of any kind or at any rate had been effected.)

Finally, on 25th May, 1838, the Commissioners, although disclaiming any present intention of raising the rents of pasture land leased to the holders of the first 437 Land Orders, instructed the Resident Commissioner that nevertheless any stipulation as to probable future action must be carefully avoided. This enigmatic decision came as a great blow to David McLaren, who characteristically enough argued that the 10s. rental per square mile originally allotted to the holders of the first 437 Land Orders, was in effect meant to be given in perpetuity.

Governor Grey then went on to say that "it was equally apparent both to the settlers and the Government that it would be impossible to give effect to their (the Colonisation Commissioners') instructions, and *no attempt whatever had hitherto been made to do so.* In order to fulfil them literally as regards only proprietors who purchased land before the 31st August, 1836, it would be necessary to survey 1,550 square miles of country. To afford claimants any choice of situation or selection, as contemplated by the Commissioners, double that quantity of land ought to be marked out, and even this increase would prove totally insufficient to give a fair choice of selection. On account of the preponderance of bad over good land, at least 3,100 square miles of pasturage would require to be marked out. Thus admitting most of the land, not included in Special Surveys, or in sections otherwise purchased, to be available for purposes of pasture, a tract of country from Cape Jervis to the River Hutt, the most northern of the settled districts, and averaging 30 miles in breadth, would require to be divided into blocks containing each about one square mile. . . . It is therefore hopeless to anticipate that I shall be able to fulfil literally the arrangements contemplated by the Commissioners: the spirit of them I will, however, endeavour to act up to in as far as lies in my power." (4)

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(4) Proceedings of Royal Geographical Society of Australasia, vol. 17, pp. 11-16.

Such then were the unknown conditions for which the Colonisation Commissioners during six consecutive years attempted to provide—but altogether without success: partly one would imagine owing to the remissness of their Australian representatives.

The first livestock to reach South Australia was the property of the South Australian Company, brought thither by the company's ships. The following was an extract on the subject from the Company's first report: "They (the Company) had commenced their stock by purchasing a very superior lot of pure Merino rams and ewes, selected in Saxony for a sheepholder in Van Diemen's Land, but afterwards handed over to them (the Company) at little more than prime cost. They (the Company) had also sent out some pure Leicesters and Southdown sheep; but for the general supply of this stock the Board looked to the neighbouring colonies of Van Diemen's Land and New South Wales, and occasionally to the Cape of Good Hope, where sheep for mutton could be bought for about five shillings each, which may also answer to cross with their purer breeds." (5)

How much the colonists were indebted to the South Australian Company's early importations for the satisfactory foundation of their flocks and herds may be judged by the following data which referred exclusively to overseas importations:—On the 22nd February, 1836, the *John Pirie*, Captain G. Martin, left London with the Company's livestock aboard: on the 24th February, 1836, the *Duke of York*, Captain R. G. Morgan, left London similarly freighted: on the 24th March, 1836, the *Lady Mary Pelham*, Captain Robert Ross, left Liverpool with Saxony Merinos aboard: on the 21st April, 1836, the *Emma*, Captain Nelson, left London and picked up cattle and sheep at the Cape of Good Hope: on the 22nd December, 1836, the *South Australian*, Captain Alexander Allen, left Plymouth with two Devon bulls and heifers and 20 pigs aboard: on the 18th October, 1836, the *John Renwick*, Captain W. Linnington, left London with 20 Cashmere goats aboard: on the 9th June, 1837, the *Solway*, Captain R. Pearson, left Hamburg with 24 Saxon Merino rams and ewes aboard, &c., &c. (6)

But eventually the greater part of the livestock imported into South Australia came from the neighbouring colonies of New South Wales and Van Diemen's Land: but from the standpoint of the early development and profitableness of its flocks, unfortunately, with the sheep of the sister colonies came "*sheep-scab*" as well—a scourge, the cause of endless trouble and untold loss to South Australian sheep holders, until by energetic combined action they ultimately succeeded in completely eradicating it from our flocks and pastures: but so desirable an end could be not more than an ideal in the minds of progressive pastoralists, until, in due course, it became possible to give legal boundaries to individual sheep runs, and prevent the contamination of clean flocks and pastures by diseased flocks.

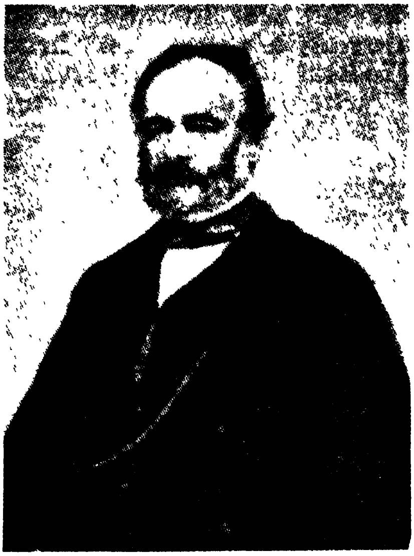
Here again in the matter of intercolonial importations the South Australian Company was the pioneer importer of livestock, in the form of cattle, horses, and sheep imported from Van Diemen's Land by its first Colonial Manager, Samuel Stephens, for its Kangaroo Island settlement. Next in point of time, came Colonel Light's more or less abortive attempt to secure fresh provisions and meat for his men, who were badly suffering from scurvy, and working bullocks for the requirements of his surveyors. To this end he entered into negotiation with Captain Duff, of the *Africaine* towards the end of November, 1836: and the latter was instructed to proceed to Hobart Town and secure "800 sheep, 10 oxen, with cars complete, such as are used by the Government Surveying." Unfortunately, on the return journey, the *Africaine* met with heavy weather, during the course of which most of the sheep were reported to have perished.

(5) Condensed first report of South Australian Company, 20th May, 1836, p. 14.

(6) *Vide* South Australian Company's first report and supplements.

Losses of livestock such as these, but more especially sheep, were by no means uncommon in the course of transit on these southern seas. In the second report of the South Australian Company, dated 27th June, 1838, attention was drawn to the risk incurred by sheep on sea voyages, whether from England or the neighbouring colonies; risks which no underwriters were prepared to face owing to the usually high rate of mortality. During the course of that year—1838—2,000 of the Company's sheep had perished on the seas: but, added the Directors with characteristic wiliness, "as the inhabitants of Van Diemen's Land and New South Wales seemed inclined at the time to ship stock on their own account to South Australia for sale when landed, their Manager had been instructed to embrace such opportunities of adding to their flocks. Already about 100 head of cattle and 200 sheep had been thus procured on moderate terms: and if these speculations were repeated, the necessity of importation on the Company's behalf—and the accompanying risk—would be greatly lessened."

The next importers of any importance appeared to have been John Barton Hack and his brother Stephen. They broke their outward voyage to South Australia by spending a month in Van Diemen's Land, and from thence they subsequently brought away: "350 ewes, 45 wethers, 6 heifers, 1 bull, 10 red Devon bullocks, a large wagon and a dray, a plough, seed wheat, poultry, goats, provisions, three mares, and a Timor pony." Many sheep—62 out of 395—and one bullock were lost between Van Diemen's Land and South Australia. The sheep, owing to their weak condition, were hastily landed on the evening of the 12th February, 1837: unfortunately, when left to themselves they scattered in search of water, and were never seen again by their owners. J. B. Hack was told by John Hallett at the time of his landing that the only livestock on the mainland consisted of a few sheep and a pair of bullocks, together with a mule and a donkey, the latter the property of Governor Hindmarsh.



John Hallett.

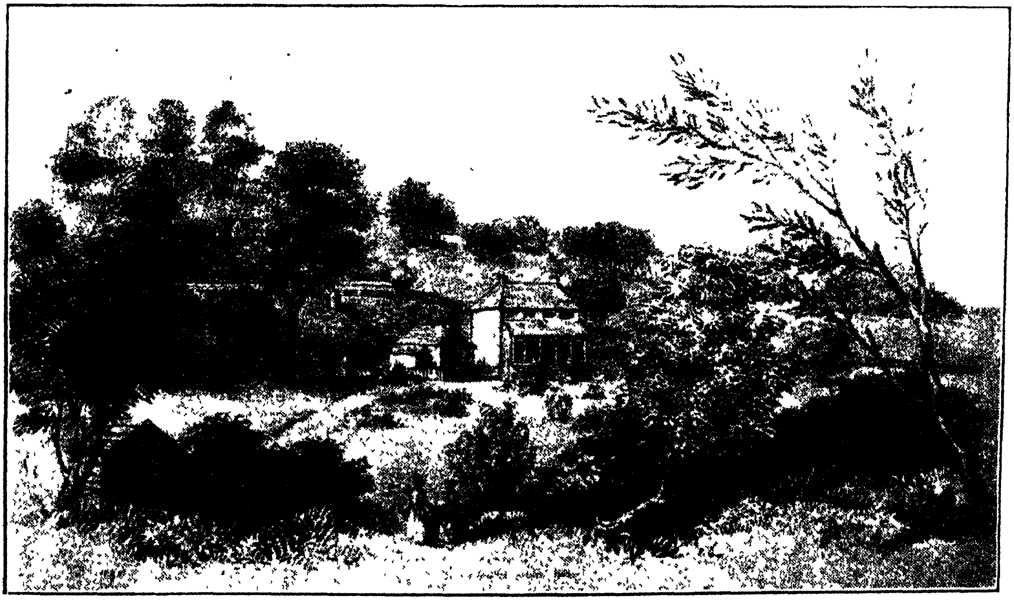
[Plate 29.]

But the Hack Brothers were to find a second attempt at importation from Van Diemen's Land even more disastrous than the first. In March, 1837, the vessel *Isabella*, Captain John Hart, was freighted with merchandise and livestock, mainly on account of Hack Brothers. The livestock consisted of "six pairs of bullocks, two milch cows, and 399 ewes purchased for Messrs. J. B. & S. Hack, who agreed to receive the bullocks if delivered in uninjured state at Holdfast Bay at the rate of £55 per pair, the ewes in like manner at £3 3s. per head, and the milch cows as Captain Hart and they might agree, to be paid by Bill on London." In addition there was a large quantity of provisions, crockery, ironware, &c., which Hack Brothers proposed disposing of at their Adelaide store. Unfortunately the *Isabella* was wrecked off Cape Nelson, and the entire cargo lost: it had not been insured probably because of a misunderstanding between buyers and sellers: Captain Hart and Henry Jones, a Van Diemen's Land merchant, were under the impression that they were acting as the agents of Hack Brothers, on a commission basis, and they had received no instructions as to insurance from their principals: whereas Hack Brothers believed that all risk between Van Diemen's Land and South Australia would be borne by Hart and Jones, and that the cargo did not become their property until delivered in good condition at Adelaide. The matter went to arbitration, and Hack Brothers were mulcted in approximately £1,400.

Capt John Hart.

[Plate 30.] (Courtesy of Archives)

Local lack of provisions and means of transport also led to importations of livestock by Governor Hindmarsh early in 1837. This question was debated in the Legislative Council, of which J. H. Fisher was at the time a member, and it was unanimously decided on the grounds of urgent public necessity that the Governor should draw on the British Treasury to the extent of £5,000 to pay for purchases to be effected in Sydney by a committee of three, consisting of Lieutenant William George Field, James Fisher (jun.), and John Erwing Barnard. In addition to flour, wagons and drays, harness, hay, &c., the committee purchased 84 bullocks at £8 and £9 per head, and 10 draught horses at £50 per head: of these one horse and 13 bullocks perished in transit: although we are told they were not a complete loss as they were salted on board. The method of payment of these purchases so essential to the welfare of the community, *i.e.*, by Bills on the



J. Barton Hack's farm at Echunga Springs, Mount Barker, in 1842.

[Plate 31.] (From a sketch by Governor Gawler).

British Treasury, brought upon Governor Hindmarsh his first official rap over the knuckles. It was pointed out to him that as he well knew, South Australia had been "erected" into a self-supporting province of the British Empire: and that in no circumstances, and notwithstanding shortage of funds, should he draw upon the British Treasury for current expenditure. This was one of the earliest examples of the utter futility of the unique principles upon which the colony was supposed to have been founded: on the one hand they threw the entire cost of government, coupled with the cost of development of an untamed wilderness, upon a community that could not be taxed, because it was without income, and would continue so for many succeeding years, and required what little capital it owned for the building up of its private concerns; whilst, on the other hand, they deprived the Government of the province of the only natural source of revenue that could possibly be open to it, namely, the sale of Crown Lands, the proceeds from which were earmarked for the purpose of finding employment for the surplus population of Great Britain, and its idle ships and ship chandlers. It was of interest to note that these Bills of Governor Hindmarsh were discounted in Sydney at the rate of 2½ per cent., whereas at the time the current discount rate on Bank of England notes was said to be 7 per cent. in the same town. The freight charges of the *Royal George*, the vessel on which the purchases of the Committee were carried from Port Jackson to Holdfast Bay were £1,100. (7)

Another unfortunate importation was one for which J. H. Fisher was subsequently held personally responsible, as in the opinion of the Colonisation Commissioners he had undertaken this transaction without their authority. Towards the end of April, 1838, the *Lord Hobart*, Captain Hawson, reached Holdfast Bay after a boisterous voyage of 61 days from Timor. He started with 111 ponies, on account of the Colonisation Commissioners: on arrival of the ship eight ponies only were alive, of which two died shortly after landing: it was calculated that each of the surviving ponies had cost about £520. (8)

But a less costly method of securing livestock for South Australia was gradually developing. Already, early in 1837, Robert Flint had offered to Governor Hindmarsh's Sydney committee to convey overland to South Australia 2,000 young ewes in lamb, 300 mixed cattle, 30 horses, mares, and geldings, and 24 true bred sheep dogs for the sum of £10,000. (9) The offer was not accepted, probably on the grounds of expense. At the same time the committee gave a letter of introduction for the Governor to a man named Gardner, commending the latter for services rendered to the committee, and pointing out that he proposed conveying a large number of cattle overland from Port Phillip to South Australia in the following spring. (10) But the honour of pioneering the overland migration movement was eventually to be earned by Joseph Hawdon, who has left us a very readable account of his enterprising expedition.

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(7) Letters of 20th March and — March, 1837, by Field, Fisher, and Barnard to Governor Hindmarsh (in S.A. Archives).

(8) *South Australian Register*, 11th June, 1838, page 2, col. 2.

(9) History of South Australia, by Edwin Hodder, page 67.

(10) Letter of 15th March, 1837, from Field, Fisher, and Barnard to Governor Hindmarsh (in South Australian Archives).

(To be continued.)

Production of Butter and Cheese.

The production of butter and cheese for January, 1937, was:—Butter, 1,426,654lbs.; cheese, 1,092,044lbs.; for February, 1937, was:—Butter, 1,195,639lbs.; cheese, 903,702lbs.

Silver Leaf Diseases in Orchard Trees

The above-mentioned subject was chosen by Mr. D. B. Adam, Plant Pathologist at the Waite Agricultural Research Institute, for a 10-minute talk (reported below) over the National Broadcasting Station 5CL on 16th March.

Plum trees growing in the hills around Adelaide, sometimes produce foliage of a silvery leaden colour, which contrasts with the dark green hue of healthy leaves. This change in the appearance of the leaves represents the beginning of a disease, which unfortunately has become more prevalent in recent years in this State.

"Silver Leaf" disease as it is called, is caused by fungus named *Stereum purpureum*. The fruiting bodies of this fungus develop on the dead branches of affected trees, appearing after heavy rain, as thin purplish-coloured brackets with wrinkled margins projecting ¼ to ½ an inch from the wood.

The smooth, exposed surfaces of these fruiting bodies produce myriads of exceedingly small spores, which like the seeds of ordinary plants serve for reproduction. These spores are carried about by air currents, and if they happen to alight on a fresh wound on a plum tree germinate there, giving rise to a spawn, which grows into the wood of the tree.

What ultimately happens depends on the position where infection has occurred, the variety of plum and its vigour. In a typical case the leaves on the branch, which has been infected, become silvered in the following spring. This "silvering" may be repeated for one or two seasons, but "dieback" often sets in, and may be completed in one or two years. It is only after a branch has died, that the fungus produces its fruiting bodies, and for this purpose it requires a good winter rain.

Although "silvering" followed by "dieback" is quite a common sequence of events after infection, it is by no means the only course that is followed. Sometimes a tree may show a silvered branch for two or three seasons, and then recover its normal foliage. This is generally a real recovery, and is due to the production of a barrier of gum around the fungus, which stops its further growth. The capacity to do this depends on seasonal conditions, the variety affected and its vigour and growth.

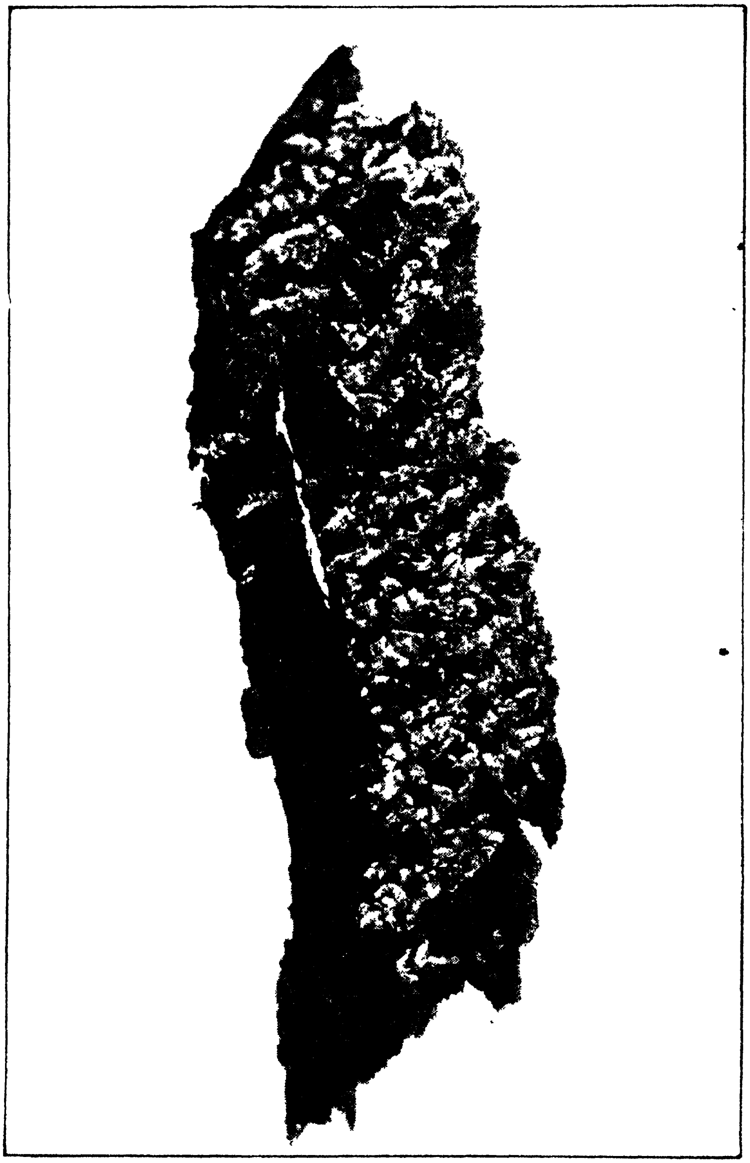
This brings me to the first difficulty we have regarding this disease as it occurs locally.

"Silver Leaf" is well known and seriously regarded in England, with the result that it has received a good deal of attention. In Australia, apart from its identification practically no experimental work has been done with the disease, and one has to rely for facts on the English investigations. On many points the detailed work of Prof. Brooks and his associates at Cambridge is of great value to us, but there are points of detail, which can only be solved by local investigation and study. The comparative resistance of different varieties is one of these. I have been told that the variety Grand Duke for instance, is resistant to "Silver Leaf", but the information available is not sufficiently broad-based to permit of confident recommendation on the subject. A systematic survey of plum orchards in the districts where "Silver Leaf" occurs would yield useful information. With regard to seasonal conditions and plant vigour, it is probably safe to assume that the same factors apply here as do in England, viz., warm summers and vigorous growth on the part of trees, lead to their natural recovery.

Before passing on to consider the control measures of this disease, I should like to mention one or two facts about the disease.

Firstly, as regards the "silvering". This is not due to the presence of the fungus in the leaves. It is an example of action by the fungus at a distance. The fungus is confined to the wood in the neighbourhood of the cut at which it entered. In this situation the fungus apparently produces a toxin, a poisonous substance, which is carried in the sap to the leaves where it brings about the changes responsible for the silvered appearance.

A second point of interest is the range of plants susceptible to "Silver Leaf" disease. Plums are the most susceptible of orchard trees. Apricots are also often "silvered" but they, together with peaches and apples, possess considerable powers of recovery. Many other plants have been described as susceptible to "Silver Leaf". Mr. E. Leishman, Horticultural adviser for the Mt. Lofty Ranges District for instance, told me that he has observed the disease on the tree lucerne. In England quite a number of deciduous trees, rambler roses and even Rhododendrons have been found to be susceptible to it. In Australia our native forest trees fortunately appear to be immune. I would like to emphasise the practical bearing of this. As we shall see presently the basis of controlling this disease is sanitation, *i.e.* the elimination of the fungus from our orchards. In this State, partly because climatic conditions are probably not as favourable as they are in England, but mainly because the number of hosts upon which this fungus can flourish are not so very numerous, we have, if we like to tackle the job resolutely, on a community basis a reasonably good chance of eradicating the disease altogether from the State. The disease is almost certainly an introduction, and its nature is such that its eradication should be possible.



Fruiting bodies of "Silver Leaf" fungus (*Stereum purpureum*).

Now let us consider methods of control. The first point to bear in mind is the mode of infection. This takes place through cuts or broken branches that expose the wood. Infection almost certainly takes place during the winter months, because at this time the spores of the fungus are present in the air owing to a neglect on the part of some who, having branches killed by "Silver Leaf," have permitted the fungus to produce its fruiting bodies. In addition it is during the winter months when the growth responses on the part of the tree are slight, that the susceptibility to infection is greatest. In midsummer indeed, it is practically impossible to produce an infection even where the fungus is artificially introduced to a freshly made cut.

A second point to bear in mind is the influence of the size of the cut on the risk of infection. The prospect of infection through small secateur cuts is small compared with cuts of ½ an inch or more, made with a saw. These considerations should guide pruning practice. As far as possible the trees when young should be trained so as to grow to the desired shape without the necessity of making large cuts at a later date.

Where heavy cutting is necessary one or two courses may be followed, the first, from the point of view of a Plant Pathologist, being the better course. This consists in delaying the making of any heavy cuts until early summer. This will probably mean the sacrifice of some fruit, but it is a safe course to adopt, as the healing processes of the tree are rapid and the risk of infection is low. It is not necessary to treat any such wounds. On the other hand if the heavier cuts are made at the usual pruning time in winter any such cuts should be dressed. For ordinary orchard purposes a home-made thick, white lead paint provides a satisfactory protection. A recipe for this, proposed by Mr. Brooks is as follows:—To 2lbs. of white lead paste (as bought) add two teaspoonfuls of paste driers and two tablespoonfuls of linseed oil. Mix, then add two tablespoonfuls of turpentine and mix well.

The second matter to consider is what to do if "Silver Leaf" turns up, and it is very desirable to look for signs of this in early summer. If it is found the branch is not heavily "silvered" and previous experience in the district indicates the possibility of recovery, the branch may be safely left in the meantime. On the other hand if previous experience suggests that the chances of recovery are small it is a safer plan to do something about it straight away. The infected branch should be cut down to some lateral below the apparent point of infection. If the wood of the branch shows gummy discolourations at this point the cut has not been made low enough. At times a suitable lateral to fill the gap made by branch removal may not be available. In such cases by leaving a peg-like stub of the branch it may be possible to promote fresh shoots, one or two of which may be used to rebuild the tree.

During the same inspection, trees which were observed to have been "silvered in" a previous year, and had been left should be carefully examined for signs of "dieback" and if this occurs or the "silvering" is becoming more severe, steps should be taken to cut it out in the way already described. If the infection is close to the butt of the tree it will be necessary to remove the whole tree.

All "silvered" and dead branches should be burnt as soon as possible after removal. If added to a heap of prunings kept for firewood, they are sure to produce fruiting bodies some time the following winter and so provide new sources of infection.

The Department of Agriculture early last year introduced a new regulation to deal with "Silver Leaf" along these lines, and I was pleased to hear from the Chief Horticulturist recently that the general situation with regard to dead branches in plum orchards has greatly improved this year.

[At the conclusion of his remarks Mr. Adam stated that it was then (16th March) not too late to cut and destroy dead plum branches and thus prevent "Silver Leaf" spreading. He urged those who had been a little careless in this matter to give it immediate attention both in their interests and in the interests of fellow orchardists.]

Review of the Present Fruit Season on the Irrigation Areas

[By F. R. Arndt, Horticultural Adviser.]

Spring Frosts.

The chief feature of the early part of the season was the succession of severe frosts that occurred during the spring months. Of these the most extensive, as well as the most destructive to plant growth, occurred on September 24th, 25th and 26th. Further frosts took place during October in a number of low-lying areas, while as late as 11th November, a frost of considerable severity was experienced in certain well-defined "frost pockets". These frosts did great damage to young vine shoots; the Sultana variety was the most severely affected, but considerable injury was also done to Currant vines, and to a lesser extent to wine grapes. Apricot and Peach trees also suffered in places.

The areas that were most severely affected were the Monash, Glossop, and Lone Gum sections of the Berri district, and portions of the Barmera area. Although frosts also occurred in the Renmark district, these were not so severe as those experienced in other centres, and the total damage done was therefore much less than was the case in the other areas.

Vineyard Heating.

To combat the frost menace a number of growers experimented with crude oil burners on portion of their vineyards during the frost period in order to raise the temperature of the atmosphere sufficiently high to prevent frost injury. These efforts were generally successful, and most of the fruit on the vines of the treated areas was thereby saved. However, owing to the large number of frosts experienced this season, as many as six burnings were made on some holdings; which, although justifying the expenditure on oil and labour, made the process a more costly one than it would have been in a more normal season.

Late Pruning for Plant Protection.

A method that seems to have great possibilities for the prevention of frost injury to grape vines is that of late pruning.

The most destructive frosts in the Irrigation Areas during recent years have occurred during the month of September (although less extensive October frosts have also taken place at times) and it is apparent that if the development of the fruiting growth can be delayed until the end of this month, the plants will escape injury from frosts occurring during the chief danger period.

A number of Berri growers, whose vineyards are situated in definite frost-subject areas, have been giving the principle of late pruning a trial for the past few years, and some very successful results have been obtained, especially with spur-pruned varieties. The best results have been achieved by this method of pruning with the various vine varieties when Sultanas were pruned at the end of August or early September, and with the pruning of such spur-pruned varieties as Currants, Gordos and Doradillos, from the middle to the end of September. Spur-pruned varieties pruned at this time suffered no injury from September frosts, and Sultana vines were not damaged to nearly the same extent as when pruned earlier in the season.

The objection that such late pruning for a number of years would be detrimental to the health of the vines may be answered by the fact that in such areas where the vines suffer frost injury practically every other year they are much weakened thereby, and probably suffer more from this than they would from a system of late pruning.

The Apricot Crop.

Apricot trees generally flowered less profusely and more unevenly than usual, and early in the season most growers anticipated a crop considerably below the average. In addition, the spring frosts did considerable damage to young fruit on trees situated in low-lying areas.

However, subsequent conditions proved favourable for the good development of the fruit, as this on most trees grew to a very large size, and quite made up for the relatively light setting. Weather conditions were also favourable for the drying of the fruit, with the result that the crop of dried fruit harvested was above the average, both in quality, and in quantity, the amount of large, high grade fruit being greater than it has been for a number of years.

The Peach Crop.

Peaches generally flowered and set well, but later in the season high winds blew a large number of fruit from trees situated in exposed areas. However, in more sheltered orchards a very good crop of peaches was harvested, especially of the Elberta variety, the chief kind grown. Weather conditions were also favourable for the drying of the fruit.

Drying Apricots on Trays.

The Pear Crop.

The present season has been a very favourable one for the pear crop. A heavy crop of fruit has been harvested, while the loss from Codling moth has been much less than usual. This has probably been due to the cool spring weather which was experienced this year being unfavourable for the development of moths, as where lures were used only small catches of moths were reported. Owing to the absence of any large demand for canning purposes, the bulk of the fruit of the Williams' Bon Chretien variety, the chief kind grown, is being dried. Several consignments of Williams' Bon Chretien and Packhams Triumph pears were exported to the United Kingdom.

The Currant Crop.

Where unaffected by spring frosts the currant vines generally set a heavy crop of fruit, which also gave promise to be one of good quality. The rains however, had the effect of reducing the quality of the fruit, but not nearly to the same extent as was the case in 1936; in that year the rains were much heavier, and occurred when the berries were in a very susceptible stage. Considerable losses from mould have occurred on some vineyards where crops were heavy and foliage dense, but on the whole the currant crop has not suffered, either in quality or in quantity, to the extent that may have been anticipated from adverse weather conditions of the past two months; generally speaking, a fairly good crop of dried fruit is being harvested, which in many instances is of a somewhat darker colour than it has been for several years.

Dip Tank and Drying Racks. Racks in background are laden with fruit.

Summer Rains.

Numerous light rains occurred during the months of January and February, the rainfall readings at the Berri Experimental Orchard registering a total of 183 points, which fell on nine different occasions. The rain was generally accompanied by humid atmospheric conditions, and owing to the absence of fresh winds the atmosphere remained humid for several days after each of these precipitations. The result of these adverse weather conditions was that the grape crop suffered considerable damage from split berries and mould.

The Sultana Crop.

Owing to most of the fruit being in a semi-mature state and generally of low sugar content when the rains occurred, Sultana grapes have suffered more from the rain and the humid weather conditions than have currants. Much splitting of berries has occurred, and a considerable amount of mould has developed in a large number of vineyards, which has resulted in loss of crop and in poorer quality fruit.

Sultana Drying.

Owing to rain damage and consequent splitting and darkening of berries, many growers are using a plain caustic soda dip in the processing of their fruit, with the object of giving the dried product a more even colour, although of a rather brownish shade, to correspond with the colour of the damaged berries. Temperatures of the dips have varied from as low as 185deg. Fahr., up to 196deg. Fahr. (with sufficient caustic soda to crack the fruit slightly), the temperatures most often used being in the region of 190-192 degs. Fahr.

Where better fruit has been available a considerable number of growers are using the Standard Mixed Dip, consisting of 2¼lbs. of carbonate of potash, and 1½ pints of olive oil to 50 gallons of water, with sufficient caustic soda to crack the fruit slightly. In some instances the temperatures generally used, namely, 177-182degs. Fahr, have been raised from 185 to 190deg. Fahr., making allowance for the quality of the fruit.

The Cold Potash dip is also being used to some extent, chiefly in the Renmark area, where several large growers with ample rock space have utilised this method for several seasons. With the average grower however, this method has not become popular, partly on account of the longer time occupied in the drying process, and partly on account of satisfaction with the results obtained from other dips. At the time of writing (12/3/37), the harvesting of the Sultana crop is well under way, with good weather conditions now operating, but so far little fruit has as yet been fully dried. It is therefore rather early to forecast as to the completed crop; judging however from present indications it would appear that although the food value of the fruit will probably be up to the usual standard, it will be darker in colour than it has been for some years.

Other Grape Varieties.

Gordo Muscat vines have again borne heavy crops, whilst Doradillos are also bearing well. Neither of these varieties suffered serious frost or rain losses, and provided that the weather remains reasonably clement for the remainder of the season, satisfactory crops should be harvested. Pedros, however have suffered heavy rain losses, and in this respect have proved to be more susceptible than either Currants or Sultanas.

The Smyrna Fig.

The Smyrna fig crop has suffered severely from the summer rains, and a large proportion of the crop has been lost. The quality of the fruit has also been adversely affected and the average grade of the dried product is lower than usual.

A Note on *Brassica Tournefortii*, Gouan.; A Cruciferous Weed New to South Australia

Mr. G. H. Clarke, Botanist at the Waite Institute, reports that a specimen received, early this month, from the Murray Mallee has been identified at the Institute as *Brassica Tournefortii*, Gouan., a cruciferous weed, somewhat resembling Charlock (*B. sinapistrum*, Bois.) in appearance and properties. In its native home this plant has an extensive distribution throughout the Mediterranean region and Asia Minor. In this country it has been known since 1928 as an introduced weed in Western Australia, and, until now, has not been reported to occur outside of that State, in which it is called "Wild Turnip," a name which, in South Australia, is applied to a different though related plant. In the West *Brassica Tournefortii* has shown a remarkable disposition to spread and it already occupies several large areas of agricultural land Owing to the serious view taken of this weed by officers of the Western Australian Department of Agriculture, and to the likelihood of its becoming established throughout the wheat areas of this State unless preventive measures are undertaken, Mr. Clarke is preparing a descriptive account of the weed for inclusion in the *Journal*.

Dehorning of Cattle

Mr. H. B. Barlow discussed "Dehorning of Cattle" in a recent wireless broadcast statement through 5CL. He dealt with the subject both from the point of view of the dairyman and in the interests of the meat industry.

As far as the dairying industry is concerned, from observations made by the officers of the Dairy Branch of the Department of Agriculture, we are quite satisfied that for the ordinary man handling a herd of grade cows dehorning cannot be other than advantageous.

The owners of pure bred or stud herds, having the possibility of show requirements to consider, will need to give the matter further consideration.

To what extent the dehorning of purebred cattle is likely to jeopardise their show-ring records in Australia has yet to be proved.

With the exception of Ayrshires and possibly female Jerseys, we have many examples of dehorned dairy cattle, both male and female, obtaining the highest awards in the show ring, which indicates that outstanding animals without horns can at least hold their own with their horned competitors.

As an indication of our sincerity in the advisability of dehorning a large dairy herd we have taken the liberty, probably much to the disgust of many Ayrshire breeders, of dehorning every animal in our Ayrshire herd at Kybybolite Farm in November of last year. Up to date, observations would tend to indicate that this drastic action is going to prove a direct economical gain as far as production is concerned, and will not deter us from exhibiting a strong team at the next Royal Show.

The reasons for deciding on this action were:—

1. The injury caused through horning to the udders, flanks, and hindquarters of the cows. Many cases of mammitis and bruised udders were directly caused by horning.

2. When in the bail yard the cows were always excited and nervous, and continually on the *qui vive* in case another cow horned them from behind. The general result was an excitable, agitated herd, instead of calm, contented cows.

3. When feeding hay or ensilage distributed in the paddocks, the older and more pugnacious cows were continually chasing the younger or weaker animals, again causing agitation in the herd.

Since dehorning a remarkable change has come about. Whilst in the bail yard at present, instead of a constanly milling, horning, excitable herd, we now have a lot of contented cows, peacefully chewing their cuds, and difficult even to push out of one's way if requiring to walk through the herd.

If any concrete example were required as to the effect dehorning has on the temperament of a herd of dairy cows it would be difficult to have it more definitely stressed.

With reference to the dehorning of beef cattle, a request was recently made through the agency of the Australian Meat Board to discuss this matter. So important does this Board consider the dehorning of cattle that it has issued a pamphlet—which, by the way, is designated "Pamphlet No. 1"—dealing with this matter from the point of view of the beef producer, and I will take the liberty of quoting a few extracts from this valuable pamphlet. It states:—"The purpose of this pamphlet is to bring before Australian beef producers the desirability of the general adoption of the practice of dehorning cattle.

"Dehorning is very little practised in Australia. Australian cattle raisers have, no doubt, secured good returns at different periods in the past without dehorning, but conditions have changed, and it may be long before these good times return. In any case, the maximum returns under any set of marketing conditions should be the aim of all producers, and the elimination of bruising due to horning will undoubtedly assist in the realisation of this aim.

"Whether the individual producer raises cattle for the home meat market or for export, dehorning means enhanced returns. Horns on cattle result in bruised meat, defective carcasses, and grading down of whole carcasses. This is a matter of general opinion among leaders of the industry, and statistical evidence is available to prove it.

"For the producer supplying the beef export trade the arguments for dehorning are all the stronger. At the present time the beef export trade is on a strictly competitive basis. Dehorning is generally adopted by our principal international competitors, and we cannot afford to neglect any detail which places us at a competitive disadvantage.

"It is generally considered that the future of the beef export industry in Australia depends largely on the development of the chilled beef trade. The chilled beef trade demands first grade, unblemished carcasses, both because such beef carries better over the long journey, and because of the high-quality article with which it must compete. Horned cattle with the damage they cause to carcasses should not be tolerated. Bruising means lower returns to the producer. It also means less beef of good quality for export.

"In his November report, the Commonwealth Veterinary Officer in London states, *inter alia*: 'Excessive bruising, particularly in the leg region, has been in evidence. It cannot be sufficiently stressed that bruising in imported supplies is practically negligible, except in the case of some Australian beef. If dehorning would assist reduction of bruising in any degree, it is desirable that the practice should extend as rapidly as possible.'

"Dehorning means money in the pockets of cattle producers. The general adoption of the practice in Australia will add a percentage to the profits of Australian producers, and in these times when profits are so small this is a consideration which cannot be neglected. Australia must fall into line with its competitors in every detail which serves to enhance the quality of its meat."

In Argentine, Australia's principal competitor in the beef export trade, dehorning is undertaken as part of the yearly routine operations on estancias, and horned beasts in herds are rare exceptions.

Argentine has undertaken dehorning as part of its general policy of raising the efficiency of the industry, and Australia cannot safely do less.

The Australian Meat Board considers that at the present stage of the industry the question of dehorning is of great importance, and urges it upon the attention of all cattle raisers.

Time will not permit of my going fully into the operation of dehorning, but as far as dairy herds are concerned the calves can either have the horn buttons treated with a caustic pencil, or removed by a special dehorning instrument. Personally, I prefer to use the instrument, as the operation can then be delayed until the calves are 6 to 9 months of age. This allows more time for the forehead to develop or broaden, and in my opinion improves the animal's appearance.

For large numbers of beef calves the caustic treatment is too slow, the instrument being much quicker and simpler, and could be carried out at the same time as branding without delaying the branding operation to a noticeable extent.

For all animals up to three years of age, instruments are available which will do the job efficiently and expeditiously if a suitable crush is available.

For old cows or mature bulls, a specially strong instrument is available, or if desired a sharp saw and probably a local anaesthetic will give good results.

Full particulars of the dehorning of dairy cattle are available from the Department of Agriculture, South Australia, and the pamphlet on dehorning beef cattle can be obtained from the Australian Meat Board. Any persons interested should get in touch with these bodies, and they will receive all practical assistance.

Papers Read at Conferences

The Blowfly Pest and the Farmer's Flock

[F. A. Wheaton, Red Hill (Koolunga Conference).]

It is not the aim of this paper to delve into figures relating to losses caused by blowflies. Sufficient to say that to the sheep owner, the blowfly provides him with a constant job.

With the aim of eliminating the activities of the fly, various preparations are marketed, meeting with variable success and failure, for while one man on a certain type of country and herbage will swear by a particular brand, another man on different country growing different grasses will swear at the same brand.

A couple of years ago Mr. C. A. Goddard, School of Mines Assistant Wool Instructor, visited our branch of the Bureau, and in the course of a very excellent talk, made the assertion that farmers were themselves to blame if they had fly blown breeding ewes. He stated that a dressing consisting of ½lb. white arsenic, ½lb. washing soda, boiled together in about 1 gallon of water and then diluted with water to 7-8 gallons, well rubbed in to the crutch of the sheep after crutching, would prevent fly strike for about 6 weeks. I tried it, but Mr. Goddard's optimism did not bear fruit with the treatment when practised by me. However, I persisted, when crutching again, and found that when applied two or three times during the year, the mixture certainly became more effective as a preventive. It should be stressed that Mr. Goddard did not advise this treatment for sheep that were struck.

In conversation with Mr. R. K. Hosking—Chemist of Crystal Brook,—from whom I purchased the arsenic, I told him of my experience, and he recommended boiling soft soap with the arsenic and soda, with the aim of keeping the preventive on the sheep for a longer period. Soft soap was not available when wanted, so I used ½lb. ordinary washing soap. It is rubbed hard around and under the tail with a large sized boot brush. I have found this mixture to be a distinct advance on anything which I have previously used.

Anything that might be said, however, must not be taken to detract from the great importance of frequent crutching—every 3 months, or less during summer months. This mixture is cheap and easily applied; to treat 300 sheep, the ingredients will cost less than one shilling.

This treatment represents a definite advance; not a big one, for it is by no means perfect, but a contribution towards the Prevention of Blowfly Strike, which causes so much annual loss.

I wish to take this opportunity to thank Mr. Goddard and Mr. Hosking for their advice, which has been a distinct help to me.

Sheep and the Blowfly Pest

[H. J. Crouch, Red Hill (Koolunga Conference).]

Sheep are the most profitable side line to the wheat farmer, they help to keep weeds down on the fallow, and compact the soil by running over it. Sheep should be handled carefully to get the best results from them. I do not like buying sheep from large sheep stations—especially ewes—as they are too wild to breed lambs on small farms, particularly lambs for export.

If forced to purchase station ewes for breeding lambs, always retain a good small flock, bred on the farm. If they have been kindly treated, they should be very quiet, and will help considerably to keep the station ewes a lot quieter. They will feed better, are more easily handled, and easier to shift from paddock to paddock.

The full mouthed outback station ewe never becomes as quiet as the ewe bred on the farm. The former are poor ewes for breeding export lambs, as their back teeth need a lot of attention.

The best way to get sheep quiet is to walk or ride amongst them two or three times a week, very quietly and without dogs at first, and they will then gradually become calm. Another good method is to handfeed the sheep with hay or chaff, and walk about them quietly while they are feeding.

Small farmers should buy farm bred ewes, or ewes from small stations in the hills. Cull the ewes if breeding lambs for export, as well as for breeding lambs to be retained on the farm for breding purposes later on. This improves the standard of the lambs. Cull all undersized ewes, and those that are wrinkly or coarse woolled.

So far as the blowfly pest is concerned my experience has been that the wrinkly sheep with wrinkly tail and thigh, and narrow in the crutch, are the worst offenders The Mules' operation of cutting off the wrinkles around the crutch will help to keep those sheep that have been done more free from the attack, and may prove that the wrinkly crutch is a big factor in attracting the fly. If it is carried on by stud breeders, it will be a long time before the result is effective. Farmers who buy rams done by the "Mules" operation will not be able to see the sheep in their natural state, or be able to know how wrinkly they were before being treated. "Like begets like", and if the rams are wrinkly, the lambs thrown by them will most likely be wrinkly too.

About 6 years ago I started culling all wrinkly sheep in my flock. The result was amazing, and since then I have had very little trouble with the blowfly. If the sheep are plain bodied and get struck, the fly or maggot does not trouble them like the wrinkly ones, as they are more easily cleaned out. I always crutch in March, and put them over the shearing board. Shear two or three inches above the tail—this is most important. The end of September seems the best time to shear the sheep in this district against the fly attack. Since I got rid of the wrinkly sheep, the blue bottle blowfly has practically disappeared from the farm. The first attack on the blowfly should be breeding of plain bodied sheep, free from wrinkles around the tail, thigh, and across the rump.

Bulk Handling of Wheat as in New South Wales

[E. T. LePage, Koolunga (Koolunga Conference).]

Last year 25 million bushels were handled in bulk in New South Wales and this year about 29½ out of approximately a 50 million bushel harvest will be handled. There is only one terminal operating at present, which is at White Bay, Sydney. Another is being constructed in Newcastle. There are various country silos, and trucks equipped for bulk handling bringing the wheat from all parts to the terminal, which is about 8 million bushels capacity and 20 odd million bushels are handled annually through this terminal. The trading in bag wheat is definitely restricted to force the wheat to the silos, as at stations where there are silos, it is not possible to obtain a stacking site to compete on equal terms for bagged wheat. A block can only be obtained by making a signed declaration (and lodging a deposit of £250) guaranteeing that only special types, of possibly hard wheat, will be handled, and at a premium in price of not less than 2d. per bushel, or unless wheat is damaged by heavy rain or otherwise, and refused admission to the silo.

The New South Wales Railways have three sizes of railway trucks to transport wheat to the terminal, viz. of 14 tons, 19 tons and 20 tons capacity. Doors are operated at the bottoms of the trucks to allow the wheat to drain from the trucks, but there is much to be desired in the construction of some of these, for in some cases much shovelling is required to empty the trucks. On arrival at the terminal silo, the trucks are run over a grating above a bin between the rails, through which the wheat is let drop. From this point it is conveyed by belt and cup elevator to the weighing bin. They have two types of weighing machines; one a zero scale that weighs up to 96,000lbs. and the other an automatic drop scale, which automatically shuts off and drops the contents immediately the weight reaches 4 tons. As each truck is emptied the fact is signalled to the man on the weighing machine, and the weight of each truck is thereby checked. On the wheat leaving the weighing bins, it is elevated and easily directed to any of the 143 bins, which each hold about 70,000 bushels, being 108ft. high and 30ft. in diameter. There are also a few bins 72ft. high. Wheat is also stored in the sections between the round bins. Satisfaction is not always expressed by farmers of the weights given at the terminals of wheat sent in trucks from the country, possibly due to a leakage from the trucks in transit. With the outrun at the terminal, they informed me that shortages predominate over gains. It seems that a good deal is lost with friction from handling with bulk methods. There are always two bins kept as spares, and the wheat is not left longer than 6 weeks before it is turned, and oftener if necessary. Walking through the premises helps one to realise the amount of wheat dust this friction creates on large quantities, as everywhere everything is covered with wheat dust; in fact, looking in at the top of the bins, one would not know it was wheat, as the layer of dust almost completely obscures the grain. Between 70,000 and 80,000 bushels of wheat dust are sold annually in handling 20,000,000 bushels odd. This, the overseer remarked, helped to recoup some of the losses.

The terminal can discharge wheat to the ships at the rate of 1,800 tons per hour. The wheat is gravity fed from the bottom of the bin and elevated again from the weighing bin (this is where the automatic weigher excels). It is then conveyed either on belts or elevated with cup-elevators as required, to the gantries and distributed to the various holds of the ship. They also have winnowing machinery for cleaning wheat if necessary, but it is not used generally. With equipment of conveyors and gantries, they can distribute to one, two or three ships in line. It is usual for at least one hold to be covered with bagged wheat with a layer about 5 bags deep to prevent the cargo from moving. The ship has to be inspected before loading, and certified properly fitted and suitable for bulk loading, and inspected after loading and before going to sea. Freight rates for bulk are about 27s against 28s. 6d. per ton for bagged wheat.

When it comes to sales by the farmer, you know the conditions applying to bagged wheat. For bulk wheat in silo the farmer holds a negotiable warrant, and is subject to the following conditions:—

Less ½d. per bushel than price for bagged wheat at outports.
Less 2d. per bushel for silo handling charges
Less rail freight from country stations.
Less ⅛d. per week (½d. per month) storage after 31st March.
Storage charges last year operated from 28th February.

There is generally a much more limited period over which silo wheat can be held than bagged wheat, owing to the silos having to be ready to receive an incoming crop. As there has been some anticipation of bulk handling in this State, it seems that it is advisable to thoroughly investigate the advantages and disadvantages of the system right from the user to the shipper to decide the possibilities in our State, where we have the disadvantage of many outports to equip with suitable handling equitment; and to decide why, where they have these facilities, it is necessary to practically suppress open competition.

Pigs

[T. R. WELBOURN, Narridy (Koolunga Conference).]

At a conference two years ago, a member read a paper on pigs and in his opening remarks, condemned the Berkshire, but to-day I intend to say a little in favour of this breed. No breed of pigs has been improved and selected during the last few years like the Berkshire. With the introduction of the Canadian Berkshire and the mating of them with selected old-type Berkshires, a pig of excellent type has been produced with very good length and depth, combined with shapely ham. The head carries greatly reduced weight, and the heavy old-type jowl has been eliminated.

At the last Crystal Brook Show, in the Baconer for Export class, 3 breeds were exhibited, viz. Large White, Tamworth and Canadian Berkshire, and the prize was secured by the lastnamed, which goes to prove that the breed is not the bug-bear of the industry.

The Duroc.

The one breed that has been neglected in this State is the Duroc-Jersey. As the Tamworth pig is well known, let me compare the two. The Duroc is much better backed, having the ribs well sprung from the backbone going down with straight and deep sides; and the sows do not become slab-sided like a great number of Tamworth sows do after they have had a few litters. This is a distinct advantage when topping off a finished sow as a chopper. According to Mr. McKenzie—the leading Tamworth breeder in Queensland—under similar conditions the Duroc will leave the Tamworth standing in the matter of growth. The Tamworth has the advantage that it makes its length quicker than the Duroc, as the latter lengthens out after it reaches 12 months of age. The greatest point in the Duroc's favour over any breed, is that it is essentially a grazing pig. If sty fed, the young pigs tend to run to porkers, whereas if allowed free range, very good baconers of excellent type are produced.

Pigs and the Mid-North Farmer.

If a breeder, a farmer generally has from one to four sows, and sometimes a boar. The boar is usually purchased and not bred by the farmer, and as the popular breed to-day is the Large White, one can be procured from the stud breeders.

Farmers would get a much better boar if they bought it at 6 months of age instead of procuring it as a sucker, for it is a very clever man who can judge how a pig will develop at 8 weeks of age. Judging from some I have seen in this district, the selection has been far from good.

With regard to sows, the breed can be left to the individual fancy. I would not recommend the farmer breeding pure bred Large Whites, as it is most difficult to breed a litter of 10 piglets that are of even weights at 8 weeks. Of all the Large White litters I have seen in this State, only one has been of even weights. That leaves the choice to four breeds, namely, Berkshire, Tamworth, Duroc-Jersey and Mid Yorks.

Any of the first three breeds may be chosen so long as attention is paid to lightness of head, length, depth and ham formation. Of these points, length is the most important, for the longer pigs generally have thinner back fat than the short ones, and thin back fat is the most important point in a good bacon pig. Lengthy pigs tend to have leanness throughout, which is in demand now-a-days; and long pigs have lighter shoulders than short pigs of the same weight.

With regard to the Mid York, this pig is too short and is not attractive, and had the member who spoke a couple of years ago said that this breed was the bugbear of the industry, I would have thought considerably more of his judgment

Culling.

Having mated the sows and produced a couple of litters from each, culling can be commenced. Should a sow not produce sufficient milk to keep her litter in the best order, get rid of her, however well bred she may be.

Then also, the sow that produces small litters must go, and the sow that becomes savage can also be put out with advantage, as she never seems to rear the best of litters. Many who have a good sow persevere with her, even if the litters are small, in the hope that their luck will be better next time—rather an expensive and forlorn hope. Unless a sow is very prolific, it is advisable to get rid of her after the 6th or 7th litter, as the number of pigs per litter falls rapidly after the 6th

The farmer who prefers to buy suckers instead of breeding them should procure them from farms instead of the market, as he can see under what conditions the pigs have been reared and fed. If possible, try to secure suckers as close to 40lbs. weight as possible.

From New Zealand tests, it has been shown that pigs of 16 weeks old are 2½ times the weight they were at 8 weeks. A 40lbs. sucker should weigh 100lbs. at 16 weeks, whereas a 34lb. one would only weigh 85lbs. —a very considerable difference.

Feeding.

The foundation of pig food is skim milk, and nothing has been produced that is an effective substitute. Pollard has given me the best results when milk has been insufficient. Meat meal has been rather disappointing when used with barley, whereas on the other hand, used with wheat, results have been quite satisfactory. Now that grain has risen to over 10s. per bag, there is very little margin, if any, for profit in pig feeding, and the only way to help to arrive at a profit is to graze the pigs—a practice that is not availed of to any extent in these districts. An acre of oats and Wimmera rye grass would carry for several months, the pigs kept by an average farmer.

Very often when pigs are 16-18 weeks of age they appear to remain at a standstill. This generally denotes mineral deficiency, which can be put right with bone meal, super and ashes. Or the cause may be a lack of vitamins. This can be fixed by the use of Cod Liver oil. In fact, my results from this oil have always been beneficial, and I cannot speak too highly of it. It soon makes the pigs move along, and they become glossy and attractive in appearance. The dose recommended is 1 tablespoon for each pig, every other day for a fortnight, mixed in the food.

General Field Management

[D. R. MILNE, Tatiara (Bordertown Conference).]

Rotation.

In the management of our farms, a system of rotation is necessary. There are many forms of rotation which are suitable to this district, but not one of them can be said to be applicable to all parts of the district. On the heavy land, a 4 or 5 years rotation is favoured—fallow, wheat, oats, pasture, or in the 5 year rotation, 2 years in pasture. In the lighter country where Subterranean clover grows well, but the land is not so suitable for much cereal growing, then a 5 or 6 year rotation, ploughed up and cropped one year, and then 4 or 5 years in pasture, is suggested.

Fallowing.

The land is best fallowed fairly early after the completion of seeding operations, because if it is left too late into spring, it is more difficult to get it worked down nicely before summer, and it also allows a lot of seeds to germinate.

Subsequent workings of the fallow are largely controlled by weather conditions. If spring is dry, it may be necessary to break the fallow down by means of the logs. If spring is wet, harrowing will usually give sufficient of the breaking down operation. The first cultivation of the fallow is best done with the heavy draught cultivator, as a more even working can be done with this implement than with the springtooth cultivator or combine which rides over the hard patches, and if care is not exercised will cultivate the soft patches too deeply. Other working may be done with a combine.

Seeding of Fallow.

After having been worked following the early opening rains, little more working should be necessary before seeding, but it is advisable to leave the fallow a few days after rain before working, to allow for the germination of seeds. Then it is best left for a fortnight or so before being seeded. Crops sown about one month after the opening rains are usually the best. Seed with a bushel or a little more of good, graded and dry pickled wheat, and a liberal amount of fertiliser, 112lbs. or more. The best crop seen in the district last season was sown with 180lbs. super.

Seeding Stubble Land with Oats.

Break the land after opening rains with the cultivator or combine, and sow with the combine a fortnight or so later. Use 1½ bushels of good clean oats, and 1cwt. super per acre or more. Clover and rye grass can be sown with this crop.

Cropping Grass Land.

Plough with a mouldboard plough as soon as opening rains permit, and harrow the land down with following showers. Working the land 3 weeks later will be well repaid in the subsequent yield of the crop. Seed a week or so later with the combine with the wheat or oats as desired. Clover and rye grass can also be sown with this crop; 2lbs. clover and 2lbs. rye grass should be sufficient.

Seeding and Treatment of Pastures.

Where clover and rye grass have been sown with a crop, be careful in the grazing, and see that it has a good opportunity of seeding. Shut up the paddocks when clover and grass are going to seed, for if they are only lightly stocked, sheep will eat out the best. It pays to top dress all pasture land, and the sowing of the better clovers and grasses will give a still improved return.

Grazing of Fields.

It is advisable to move sheep from one field to another at frequent intervals. Try and work it so that there are always one or two paddocks shut up, and do not open all the gates and allow the sheep to have the run of the whole place. Stubble paddocks which will be cropped with oats should be heavily stocked as soon as possible, to make full use of all available feed before it is necessary to burn. Reserve so far as possible, oat stubble for following on grazing after wheat stubble paddocks have been eaten out. All paddocks that are intended for fallow or crop in the following year should be heavily grazed, because it is better to turn all that grass into wool and manure rather than bury it in the ground; and also by grazing heavily the number of seeds which interfere with cropping will be reduced.

Control of Useless Weeds.

Careful watch should be kept for Star Thistle, Bathurst Bur, and all other useless weeds. Pasture lands are too valuable to be growing such. The use of the hoe is the best means of keeping all such in check.

Use of Stable Manure.

This most valuable fertilizer is too often allowed to go to waste. If this manure is carted on to poor patches of soil that are to be found in every paddock, and spread rather thinly in preference to being too thick, a great improvement will be seen in the next crop, and in the pastures which follow. Spread it on the paddocks which are coming under crop the following year.

Care of Fences.

This is a branch of field management which will never be completed, because even on the best improved farms, wires get broken and posts decay. Much annoyance and labour will be prevented if fences are kept in good order.

Care of Flocks and Herds.

Provision of sufficient feed and water are the greatest essentials. Keep water-troughs and dams clean, and have water in every paddock, if possible. See that all stock have free access to water at all times.

In order to make full use of all feed growing in the fields, adequate reserves of hay, grain and silage should be kept on hand to provide for lean periods of the year. If hand feeding is necessary, do not wait until every vestige of grass has been eaten and stock have become poor, but rather try to keep them in good store order, not fat. With sheep, be watchful for any signs of maggot.fly, and act immediately any signs are seen, as delay will probably be costly.

Farming to-day demands that we should make the best use of the land, and best results will only be obtained by careful consideration of the adaptability of the land to the various systems of rotation, and careful management of all the incidental factors which go to make a successful farm.

Barley

[S. G. CHYNOWETH, Boor's Plains (Yorke Peninsula Conference).]

Barley is useful as a green fodder, both on wheat and sheep farms, and also in districts suitable for dairy stock. It is the earliest straw crop for green feed that the farmer can grow, and a succession of feed can be maintained. Barley as human food is limited to a preparation known as "Pearl Barley", as poultry food it is valuable, and all pig raisers attest to its high qualities as a producer of pork and bacon of the best grade.

Classification.

The two-rowed barleys are so called because they have a row of grains on either side of the main rib of the ear, while the six-rowed type has six rows of grains to the ear. These rows are not at all level to the eye if an ear is broken across, but six-rowed barley is a convenient term for the group. Skinless barley, though included, is a very distinct type; there are no beards to the ear, the grain is enveloped in thin chaff and is easily threshed, the absence of husk giving it the appearance of wheat. In the bearded barleys the six-rowed type can be identified by the presence of two smaller twisted grains for each large straight one, while in the two-rowed type, there are no twisted grains. The seed of the latter is usually fuller and more rounded with less husk than that of the six-rowed barley.

Climate.

A district with a comparatively good rainfall and cool climate is well adapted for two-rowed barley. In warmer districts where grain ripens quickly and it is not possible to grow a good sample of this class of barley, the six-row variety will be found more profitable. Of course, the latter will not command such a high price as two-rowed barley, but the increased yield more than compensates for a lower price per bushel. Skinless barleys are drought resisting and well adapted for grain production in dry districts, as well as for silage, the earliness of the crop enabling the grower to make ensilage before hay-making begins. They are also much used for green fodder. In districts of good rainfall this barley grows weak straw, which lodges badly if the crop is left to ripen grain.

Soil.

For barley, the soil should be only moderately rich. The best grain is obtained after a crop of wheat or oats, given sufficient period of fallow between. The most important consideration is the condition of the soil, although any wheat soil will grow good barley. It should be so worked that it is in a mellow and friable condition when the crop is sown. It is an early ripening cereal, and the root growth is shorter and less abundant than that of oats and wheat, so that it is necessary to sow it on land that is in a high state of cultivation. Too rich a soil causes the crop to lodge; while low lying, undrained land is unsuitable as barley cannot withstand a great amount of moisture in its young stages.

Rotation.

Barley should follow a straw crop, such as wheat or oats, though on light or poor land it would be better to come after a green crop, or good fallow. A good plan is to sow barley after wheat which has been cut for hay. If hay stubble is ploughed as soon as possible, there is time for a few months fallow before sowing barley in May. Another most important consideration is that by this method there is no risk of self-sown wheat in the barley sample, and if a hay crop of wheat is sown after barley, the farmer will be able to keep his land free from self-sown barley. Sheep turned on the stubble usually pick up a large percentage of fallen grain. Millers strongly object to barley mixed with wheat, and such a sample is not satisfactory for seed purposes. In many districts where wheat growing and sheep raising are combined, barley is an excellent substitute as a crop for grazing, either sown alone or sown with field peas in February or March.

Varieties Recommended.

Two-rowed type (commonly called "Malting Barley"): Pryor.

Six-rowed type (commonly called "Feed Barley"): Skinless for early winter green feed, Cape and Trabut for green fodder and grain for stock.

The following are brief notes on these varieties. *Trabut*: A rather short, compact-eared, awned barley of the Cape type, with attractive yellow grain about the same season as Cape. *Cape*: A very largely grown, six-rowed type, ripening early and with long awns and grains of a bluish-green tint. Though usually regarded as a feed barley, bright samples are suitable for malting purposes. *Skinless*: Awnless, very early grain, very distinct in appearance, as the hull comes off in threshing. *Pryor*: This variety matures about the same time as Cape, and may be sown at the same time. It is a good variety for a wheat district, as it may be harvested before wheat-stripping starts. The ear is long and drooping, with full awns and two rows of grain. It stools heavily with slender straw of medium height, and yields a plump, bright, yellowish-white grain.

Time and Rate of Sowing.

May is the best month to sow in the warmer districts for grain, April in the cooler parts. Crops should ripen before the hot weather sets in, and if sown much earlier, or later than the months indicated, the grain is liable to be more or less shrivelled. Very early sowings induce heavy stooling, and the plants are unable to fill the usually large number of heads. The quantity of seed usually drilled is about 50lbs. per acre. If sown too thickly, the crop is very apt to lodge, and as barley stools freely, there is no advantage in heavy sowings.

Manuring.

The requirements of barley are much the same in this respect as those of wheat, a similar amount of superphosphate being used, and if necessary, a little potash fertiliser. Large applications of fertiliser are only necessary on very poor land, but it should be borne in mind that barley is a short-lived plant, its roots grow rapidly, and they are ill adapted to surmount obstacles such as are presented by a compact soil, or to utilize fertilizing matters which are not ready and waiting to be assimilated.

Harrowing and Feeding Off.

Harrowing the crop is not always necessary, as it is with wheat, though circumstances may arise in which rolling followed by harrowing will be beneficial, or a stroke of the harrows alone. Barley being a surface feeder, weeds stand but little chance. Where grown for grain, it is not advisable to feed off unless the winter has been mild and the growth too rank. In such a case, it should be thoroughly fed down with sheep. There is no crop that responds better after being fed off with sheep than barley, provided the land is not tramped out of condition, but it is not wise to put stock on the crop if cold frosty weather has set in.

Harvesting.

There is a number of machines on the market to-day which deal satisfactorily with barley. Instructions for each make vary slightly, but as a rule barley requires more sieve-room and a wider aperture in the comb than wheat. Barley straw hangs together more than wheat straw, and more cavings result from the threshing, but by watching the sample of grain as it comes through, any necessary adjustments can be made. The less straw taken into the machine the lighter is the work for both machine and horses. For a brittle, dry crop, a little more space should be allowed under the beaters than when the crop is not quite so fully ripened. A reaper-thresher makes a rather better sample than a stripper as a rule, and there is no pulling up of the roots and waste of grain. The main consideration in a sample for the brewer is that the grain should be evenly ripened, plump, bright in colour, mealy rather than flinty when broken, and free from cracked and damaged kernels, which cause faulty germination and moulds in the process of malting.

Disadvantages.

There are many drawbacks to barley growing, the chief of which is the fluctuation of price. When there is a good season and a full supply, merchants cut down the price, which is not regulated, as in the case of wheat, by the world's markets but has a purely local value. Damage by unfavourable harvesting weather occurs in some seasons, causing a big drop in prices. Rain at harvesting time discolours the grain, and is more apt to cause lodging of the crop than in the case of wheat. The harvesting of barley demands more care and attention than need be given the wheat; cracked or chipped grains are very objectionable. Although the farmer who grows barley is not compelled to advertise the fact in his wheat fields, the mixing of wheat with barley grain is a source of trouble on some farms. The fact that barley is subject to Take-all and footrot is rather against its inclusion in a rotation with wheat. Oats, which are not affected by these diseases, are most suitable for this purpose.

Diseases of Barley.

Covered Smut. This smut is so-called because the smut mass occurs in place of the grain in the heads of the barley, but remains covered by a membrane somewhat resembling that found in bunt of wheat. The disease is spread by the breaking of the smut balls and the spread of the spores to healthy seeds. Smutted heads may be threshed with clean ones, and in this way clean seed become infested, the spores adhering to the outside of the seed and resulting in infection of the barley seedling. Soil infection may occur occasionally. The copper carbonate dust treatment as used for wheat, would be effective for skinless barley. Other barleys should be treated by thoroughly sprinkling a heap of the seed with formalin (solution 1 pint to 40 galls. of water) and covering the wet heap with bags for 4 to 6 hours to allow the vapour of the formalin to penetrate the mass. Sowing should then be carried out soon after treatment, in a moist, well-prepared seedbed. Where formalin is used, seed should be obtained from crops where practicable, and sowing should not be made in land infected by the smut.

Loose or Flying Smut. This smut can be readily distinguished from Covered Smut by the appearance of the heads. The smut heads are ruptured fairly early, and the spores are blown by wind on to the flowers of healthy plants. There they infect the seed and the embryo within it. Such seed when sown produces smutted plants. Fungicide treatments of seed are unsatisfactory. The most practicable method of avoiding the smut is to select seed from crops that are disease free.

Breeding and Handling Export Lambs

[E. G. Brown, Kilkerran (Yorke Peninsula Conference).]

All farmers have ideas on the breeding and handling of export lambs, but the industry is of such importance that a discussion of those ideas should not be out of place.

One of the best sidelines a farmer can have is a fat lamb flock. During some months of the year he has an abundance of feed, and the best way of using that feed is by breeding lambs which can be reared during that period of abundance and sold as feed becomes scarcer. Further, he generally has plenty of goods to bring back from Adelaide, but not enough loading for the journey to the city. In this respect also, the breeding of fat lambs works in well, as it enables him to have loading both ways.

The first essential for the successful rearing of lambs, is to avoid overstocking. It is more satisfactory in every way to grow a limited number of strong, healthy sheep than to overstock and to have poor and unthrifty ones.

The Ewe and the Ram.

There is a difference of opinion as regards the type of ewe and ram best suited for breeding export lambs. It would be hard to say definitely what actually is the best breed of ewe, and to some extent the best ram. Most of the lambs exported from Australia are Merinos, but these could hardly be called the ideal lamb. Comeback and half-bred ewes undoubtedly are the best mothers. They give a better percentage of lambs, they are not afraid of foxes, respond better to heavy feeding, the lambs mature earlier than Merinos and bred on right lines, the fleece should be of very little less value than that of the Merino. Long wool rams must be used to obtain this class of ewe, and it is here that a difference of opinion exists. Most breeds have their advantages and faults.

Lincoln: Has the heaviest wool, but a large head, and is comparatively slow maturing.

English Leicester: The fleece is almost as heavy as that of the Lincoln. Gives a good crossbred fleece when mated with the Merino.

Border Leicester: Has a lighter fleece than the English Leicester. Is a smart, active sheep, and good doer. Crossbred wether lambs of this breed are quite good, being earlier maturing than other Longwools. The Border Leicester has a good coloured flesh.

Romney Marsh: Has a very dense fleece, but somewhat harsh. It is extremely hardy and almost immune to footrot.

Corriedale: One of the best rams for crossbreeding to obtain comeback ewes. Ewes of this cross should have fleeces almost equal in value to Merinos, but have not the power to pass on early maturity to their lambs, which some of the foregoing crosses have.

Southdown: Has an excellent quality of mutton with good-coloured flesh. Nearly perfect in conformation. One of the smallest of the British breeds, but this is counteracted when mated with a big-framed ewe. One of the oldest established breeds, and is therefore able to pass on to its progeny its good qualities.

Shropshire: Not unlike the Southdown, but has darker markings. Bigger than the Southdown. Lambs inclined to be woolly around the eyes.

Hampshire: Larger than Shropshire. Very fast maturing; the head is coarse and large.

Ryeland: A larger edition of the Southdown, but not so well built or prepotent.

Suffolk: A very early maturing and hardy sheep. Has good quality meat, with a big proportion of lean to fat. Lambs tend to kill out yellow if they suffer a setback.

Dorset Horn: Very early maturing. Big head and shoulders, sometimes gives trouble in lambing.

Having mated the ewes, the next care is the rearing of the lambs. There is plenty of room for improvement in this part of the industry. Generally 70 per cent. of lambs is considered a good average, but I doubt whether most of us reach that figure.

Probably not sufficient attention is paid to this way of increasing returns. There is no reason why a 95 per cent. lambing should not be the rule instead of the exception. Attention to several points is necessary to accomplish this. Ewes with unsound udders, and those that have failed to breed for two years in succession should be culled. A higher proportion of rams should be used, and they should not all be put in the flock at once. They should be spelled occasionally, also.

Soil Fertility

[S. K. Coleman, Maitland (Yorke Peninsula Conference).]

One of the major problems confronting the wheat grower is how to retain fertility of the soil, or when such natural properties have been lost, to reclaim them and keep the soil in a healthy condition. Land which is in a sick or diseased condition is incapable of producing good healthy crops.

The introduction of power farming has caused large acreages on the average farm to be cropped each year. Frequent croppings, particularly of wheat, impoverish the soils. Liberal dressings of superphosphate minimise this loss to a great extent, but phosphate alone is not sufficient.

The soil requires a large amount of organic matter, and also it must have intervals of rest from cropping. The old Israelitish law that the land must have its stated year of rest, still holds good.

On Yorke Peninsula the danger of wheat sickness has been minimised by barley growing, which crop, from observation and experience, depletes the soil fertility only slightly. However, the fact that it is a crop, and that the land has had to be worked, has reduced the nitrogenous content of the soil to some extent, but not nearly to the same degree as successive crops of wheat, which would be a ruinous practice to follow.

Looseness of the soil is a contributory factor in soil deterioration. Low rainfall seasons have caused some of the loose grey soils to get into a powdery condition. This is not conducive to healthy, robust crops. It is a breeding ground for the enemies of cereal plants. If such land could be left unworked and uncropped for a few years, Nature would come to the rescue and effect the remedy.

If such affected land is under crop, it is not so easy to deal with. Packing the land with sheep in reasonably wet weather and when the crop is in its stooling stages is a good check against disease. A cultipacker is also useful, but this entails some cost, whereas the former method does not.

Eel Worm.

Loose soil conditions and frequent croppings have been held responsible for the appearance of a comparitively recent disease known as "Eel-worm". This disease may have actually existed for many years, but agricultural science has only recently discovered or diagnosed it. In 1922 Prof. Osborne diagnosed certain "no-growth" patches on a farm on the south side of Maitland as "Eel-worm". Since then much research work has taken place. It has been discovered that "Eel-worm" infestation is the result of certain soil and climatic conditions. They breed and thrive in loose soil. The insect or parasite is about 1/25 of an inch long, and lives on the roots of plants. It usually comes to life with the late autumn rains and attacks early sown crops, oats in particular. Plants become sickly and yellow and if the infestation is a bad one, it will probably kill 75 per cent. of the plants on the affected areas, if left unchecked. With the approach of warmer weather the pests die, but by that time the damage cannot be remedied.

This is only one of the devastating diseases to which sick or ill-conditioned land is subject. It is therefore of paramount importance that the farmer should continually seek to build up and replenish the natural properties of the soil.

I cannot too strongly urge the necessity of ploughing in organic or vegetable matter. It increases the amount of humus, and most soils are in need of humus material.

In the treatment of soils it is difficult to lay down a definite system or method because of the varying nature of soils throughout the State. On Yorke Peninsula some of the farms which were once scrub land have, in some cases, half a dozen classes of soil, each requiring different treatment. In fact, as many classes of soil will be found in one paddock. In such circumstances, all one can do is to take all the factors into consideration—soil, weather, tillage etc., and try to strike the golden mean.

Strictly orthodox farming, even if it were wise, would be difficult of accomplishment, because of everchanging conditions and where one has to battle with Nature and the elements.

Remember that our livelihood depends upon the soil, and its condition is almost as important as the soil itself. There are certain fundamental laws governing the soil, its treatment and its products. To disregard them spells failure. In order to secure the best results we must co-operate with Nature. Treat the soil kindly and generously, and it will not fail to respond to the seed of the sower.

How can we maintain the Organic Content in Soils on the average Farm?

[H. J. Cadd, Arthurton (Yorke Peninsula Conference).]

Before discussing ways and means of maintaining the organic matter in soils, it may be well to consider for a moment the important function decayed vegetable matter has on the land. When mixed with soil, bacterial activities form humus. It is well known that humus has a number of very important effects on the soil, it gives the characteristic dark brown or black colour to fertile soils, it acts like clay in that it tends to stop plant food from being leached from the land, it binds sandy soil and opens clay soil, and increases the water holding capacity of the soil. Indeed, if sufficient organic matter is present in the soil, the distinction between sand, clay or loam will be practically obliterated. In other words there would be little difference in the crop capacity of the so-called different classes of land, if the proper plant foods were available. The average farmer, however, seeks to grow maximum crops without paying very much attention to the proper feeding of his soils.

Rotation.

The best treatment that we give wheat land is perhaps fallow, wheat, grazing, the fallow followed by wheat, with perhaps an occasional small sowing of oats or barley.

In some instances there has occurred during recent years, the system of fallow, wheat, burning off the stubble, then fallow. followed by wheat once more. The first mentioned system, whilst giving the land a little chance of retaining some of its original fertility, does not add sufficient organic matter to the soil to make up for the heavy loss incurred by bare fallowing and the subsequent crop of wheat; while the second system can only mean the utter exhaustion of the best soils in a very short space of time. It would appear, therefore, to maintain soil fertility, some alteration in methods of farming will have to take place. Probably wheat crops will be less frequently grown. This, however, does not mean that total production need be so very much less; healthy land will mean higher yields per acre.

Where it is found that crop yields are showing a decline, it will pay the farmer well to allow a much longer period between his wheat crops. Indeed, it may become necessary for him to put certain areas down to pasture for 2 or 3 years, or even longer. By so doing, he will add appreciably to the fertility of the soil. It is estimated that when herbage is consumed by stock, 90 per cent. of the mineral matter and 50 per cent. of the organic matter returns to the soil. Hence, though under grazing a proportion of each is lost, the gain in organic matter is quite appreciable, while the loss in mineral matter is relatively small. The suggested change over to livestock farming will no doubt cause wheat farmers to offer considerable opposition, many being firmly convinced that the only profitable way of carrying on is to market the product of the farm in bags. It appears, however, that Nature is taking a hand in the matter, and stern necessity will compel us to seek other avenues of farming. Under the altered system, fallowing will be reduced to a minimum, and much more of the crops and pastures will be utilised by livestock, and possibly more use will be made of cereals other than wheat.

Pastures and Drift.

The question may be asked what can we grow to provide pasture, and at the same time build up our soils. On most Peninsula wheat farms, oats, barley, lucerne, Wimmera rye grass and peas can be grown successfully. There are other species, however, from those mentioned, and good pasture should be possible. Those who are still making wheat the major crop can do quite a lot to prevent soil exhaustion by exercising a little more care in the preparation of their soil. How often do we notice the farmer burning off his stubbles early in the year, in some instances with very little grazing having been practised, the object being to make the land reasonably easy to work during the subsequent fallowing operations. In most instances, if heavy grazing methods were adopted, the straw would be sufficiently broken up to make fallowing possible, even if it was desired to fallow during the winter following the wheat crop.

If this system were more generally practised, there would be more healthy soils, more organic matter would be introduced into the soils, and on much of our wheat lands, the drift menace would be considerably reduced. Drift is possibly one of the worst enemies, so far as soil exhaustion is concerned It is rather alarming to note the spread of drift to farm lands that a few years ago were generally regarded as quite free from the trouble. This unhappy position is largely due to the reduced organic content of our soils, therefore every effort should be made to keep the land in the best condition possible. To do this, it appears that the best way will be to widen the rotation by introducing pasture years, which means diversification of farming.

Noxious Weeds

[E. H. Giles, Weavers (Yorke Peninsula Conference).]

There are a few varieties of weeds which have got a very serious hold on this district, and because of the serious menace that they are to the man on the land, the opportunity is taken of bringing the matter under the notice of the conference.

The noxious weed is one of, if not the most serious problem which confronts the primary producer. Almost every road is lined with some form or other of noxious weed, and the seed is daily being carried far and wide, to gain a footing in some new locality per medium of travelling stock, or it is blown or carried into adjoining fields.

The majority of landholders appear to regard this invasion of their properties, going on before their eyes, quite complacently, apparently not realising the consequent depreciation in the value of their land. Where such infestation exists, a 50 per cent. reduction in value as a result thereof, is not an overestimate.

In this district, the weeds with which we are most concerned are Saffron Thistle, Star Thistle, Wild Onion, Horehound, and African Boxthorn. The Saffron thistle has overrun thousands of acres on Southern Yorke Peninsula, and in some parts of the State one might almost say thousands of square miles, and is probably easily the most widely spread of noxious weeds. Owing to its prickly nature, and strong growth, it is one of the most objectionable of the pests. If it can get a start in a crop, it appears to enjoy cultivation, and plants flourish to such an extent in a wheat crop, that it is impossible to get a harvest team near them. The seeds remain for a great length of time in the ground without losing their power to germinate, and plants start at any time from early spring to well on in summer. This makes this thistle very difficult to eradicate. I commenced operations on a small patch in the year 1900. For 23 years every plant that I could find was cut up, and burned, yet excepting the drought year of 1914, there was a small crop every season.

Next to the Saffron Thistle, Wild Onion must be given pride of place. It is not so objectionable as the Saffron Thistle, but it takes complete possession of the ground, and chokes all useful fodders out of existence. It does not like cultivation, but threatens to overrun rough grazing land, and thrives on light soils near the coast, where it has a strangle hold in the Edithburg and Coobowie districts. The plant has wonderful vitality, and I have seen it flower and seed after being cut up, roots and all.

Star Thistle: The true Star Thistle is well established along many of roads; its fondness for growing on the edge, or where there is little traffic, right on the metal, bitumen included, is remarkable. So far I have not observed much of a tendency for this plant to spread over the land, but if allowed to continue to flourish upon roads, it will probably soon find its way there.

Horehound: This has only been proclaimed a noxious weed in recent years, is well established on the Southern Peninsula, and very prevalent round Stansbury. One reason for its spread is that few people realise that it is a noxious weed. If they did, they would surely destroy the few isolated plants which invariably seem to act as its advance guard. The adhesive nature of the seed aids its spread by stock of all kinds, especially sheep. It is a great robber, and being reasonably easy to destroy, landholders should on no account allow it to become domiciled on their holdings.

African Boxthorn: In good country, this is not regarded as a very serious pest. It can be destroyed almost at will, although the process may be somewhat costly. In exposed localities, it makes a splendid shelter, sheep nibble its leaves and fowls enjoy its berries What is feared, however, is that it will gradually take possession of much of the scrub land, particularly the huge expanse of mallee west and south of Warooka. If this happened, this country would become an impenetrable and worthless jungle. I trust that this short reference to the position may awaken a realization of the seriousness of the noxious weeds problem.

Methods of Control.

How can it best be faced? It will be admitted that destruction by chemicals is out of the question. It is too costly, and too dangerous. We must therefore get to work with the plough, the scythe, the grubber etc. Each individual landholder should do his part in his own interests, and the interest of the community.

The Noxious Weeds Act is a very drastic measure. A Council is liable to prosecution if it does not enforce the law. Despite this fact, Local Governing bodies are loth to take procedings against their ratepayers. Their members are generally landholders—perhaps some are themselves offenders.

If a landholder is prosecuted for failure to destroy noxious weeds he is often regarded as a martyr, and undoubtedly he is unlucky, for probably many others have land as badly infested as he. It is an unfortunate fact, when considering the enforcement of the law, that perhaps the Government itself is the worst offender.

If a council requests the Crown Lands Department to destroy noxious weeds or vermin on land under its control, the reply will possibly be that there are no funds available. This answer would not suffice in the case of the private landholder, and should not do so in the case of the Government. For months men have been working on the section of the Peninsula Road from Adelaide to Pt. Wakefield, with luxuriant growths of Star and Saffron thistles alongside them. At little cost, these could have been destroyed as they went along, and the effect, would have been excellent.

The Government having done its job, should then insist upon Local Government doing the same in connection with land under its control. This would perhaps necessitate a slightly higher rate, but the money would be well spent, and, incidentally, circulated in the locality in which it was collected. More important still, the Council would have its own house in order before demanding that others should put theirs in a similar state. Councils might then insist that landholders should commence by clearing a given space round their boundaries, and half width of adjoining roads.

It appears to the writer that unless more drastic steps are taken in their destruction, and that there is more co-operation amongst landholders, some of the worst noxious weeds will get beyond control, and collective efforts to destroy them will be abandoned.

Before it is too late, I appeal to all to take up the fight, and commence by keeping all adjoining roads clear of weeds, thus preventing their seeds being carried by travelling stock.

The Value of the Pure Merino Flock.

[J. Newell, Koppio.]

The Merino flock is of great importance to Australia and it is our duty to keep our flocks up to the very highest standards—which I feel sure is not being done by many sheep owners, particularly since the advent of the frozen lamb industry. On Eyre Peninsula alone we now have breeds of all kinds which are used on the Merino ewes to improve the lamb industry. In the course of the next few years the result will be that the present breeding ewes will have to be replaced by younger ones, and at a very high cost, which will have a detrimental effect on the value of the lambs. Further than that, those who wish to purchase pure Merino ewes will have great difficulty in doing so. Even at this early stage those who buy sheep at the sale yards are very fortunate if they can buy a line of pure Merinos. Therefore, those who now have Merino flocks should exercise great care in keeping them pure. Within the next year or two pure Merino ewes will realise high prices and may prove more profitable than the lamb industry. Another view we should take is the detrimental effect on the quality of our wool clip. Many will say that it is quite an easy matter to have cross-bred lambs and also have a pure Merino flock, but I neither think it easy nor inexpensive to do so, and should strongly advise those who have pure Merinos to keep them so.

Discussion.

Most members agreed that good Merino ewes were bred on outside country, and these would replenish the lamb breeding Merino ewes on the farms every year. It was considered a good plan to mate some of the best ewes each year with good Merino rams and so breed a few good Merinos each year. Some members who bred lambs of the Merino type were able to dispose of the surplus Merinos to freezers at a good price, but is was pointed out that these had to be kept on the farm and on the mothers for a month longer than the British breeds of the good export type.

AGRICULTURAL INQUIRIES AT MID-NORTH BUREAU CONFERENCE.

[Replies supplied by Mr. W. J. SPAFFORD (Director of Agriculture).]

"What is the best method of controlling erosion caused by heavy rain-storms?"

There is no best method of controlling soil erosion caused by torrential rains, as every case must be dealt with on its merits, because the variations in conditions and results are so very different. This is the experience of both the United States of America and South Africa, two countries doing so much towards the correction of soil erosion caused by water.

The control of the trouble depends upon spreading out the running water rather than allowing it to concentrate in ever-deepening creeks. This is done by throwing up dam banks and smaller embankments, to check the rushing water, the banks being so arranged that the concentration of water at any point is prevented, and instead of following channels only a few feet in width, the water is made to spread out over a stretch of country some chains wide.

In our climate deep channels can be prevented from extending, and in some cases can be fully reclaimed, by planting the course and the banks with suitable trees, shrubs and other plants. Some of the most valuable plants for the purpose are Almonds, Figs, Bamboos (Giant Reed), Grape Vines, Furze, Genista, Buffalo grass, Kikuyu grass, Couch grass, Wild Artichoke, Fennel, etc. Such erosion-holders can seldom, if ever, be properly established in one year, and until the plants are well developed, and the erosion absolutely held in check, no livestock (including rabbits) must be allowed on the areas being reclaimed.

"What is the best method of fallowing in the Koolunga District?"

In a climate such as is experienced in South Australia, there are not many variations in the methods of fallowing land for wheat, and most differences are connected with soil texture rather than with anything else. In the Koolunga and similar districts, shallowness of working is essential, and must not be lost sight of either at the original stirring, by plough or cultivator, nor at the subsequent workings.

The heavy-textured soils should be ploughed about 3in. deep, and be left throughout the winter undisturbed, the furrows being broken with cultivator in early September, and from then onwards a cultivator or harrows should be used whenever a surface crust or weeds render it necessary.

The light-textured soils should be ploughed or cultivated to a depth of about 2 to 2½in., and as soon as possible after the original stirring the land should be harrowed down. Care should be taken to see that the cultivation given in early September does not go deeper than the original stirring, and from then onwards cultivator or harrows are used whenever necessary.

Ploughing is necessary with heavy-textured soils, but in districts where the rainfall is relatively light, the rigid-tined cultivator does an excellent job in the original stirring of light-textured soils.

"Has the Agricultural Department up to now found out any advantages claimed by sponsers of Ceresan Dry Pickle?"

In connection with the use of "Bayer's Ceresan" as a Fungicide for Cereal Diseases, and a Promotor of increased yields, the summing up of the observations of our Agricultural Advisers for the 1935-36 and 1936-37 seasons is that (1) the results obtained as a fungicide for wheat diseases are similar to those secured from Copper Carbonate; (2) "bunt" is efficiently controlled, but the claim that it reduces or eliminates "flag smut" is unfounded; (3) it controls barley smut slightly better than does formalin; (4) although some farmers thought its use led to increased yields, no records were secured of treated crops being harvested separately.

Experiments will be undertaken to measure the results on Wheat and Barley during the coming season.

A brief report we have on the tests conducted at Merredin and Wongan Hills Agricultural Research Stations in Western Australia states:—

1. Bayer Company "Ceresan" is the best possible pickling material available at present in Western Australia for the prevention of Oat and Barley smut where it is necessary to sow on a dry seed-bed.
2. Where germinating conditions are good at seeding time, the Formalin Sprinkling method is equally satisfactory.
3. "Ceresan" effectively controls Bunt, but appears to have no advantage over the normal Copper Carbonate treatment.
4. Experiments are being undertaken this year to test the claims that the use of "Ceresan" increases yields.

Insects and other Invertebrates of Economic Importance in South Australia during the period July 1934, to June 1936

[By D. C. Swan, M.Sc., Waite Agricultural Research Institute, University of Adelaide.]

I. Introduction.

Three collections of records similar to the present survey have been published previously by Dr. J. Davidson. (¹) As in the last of the series (Davidson,

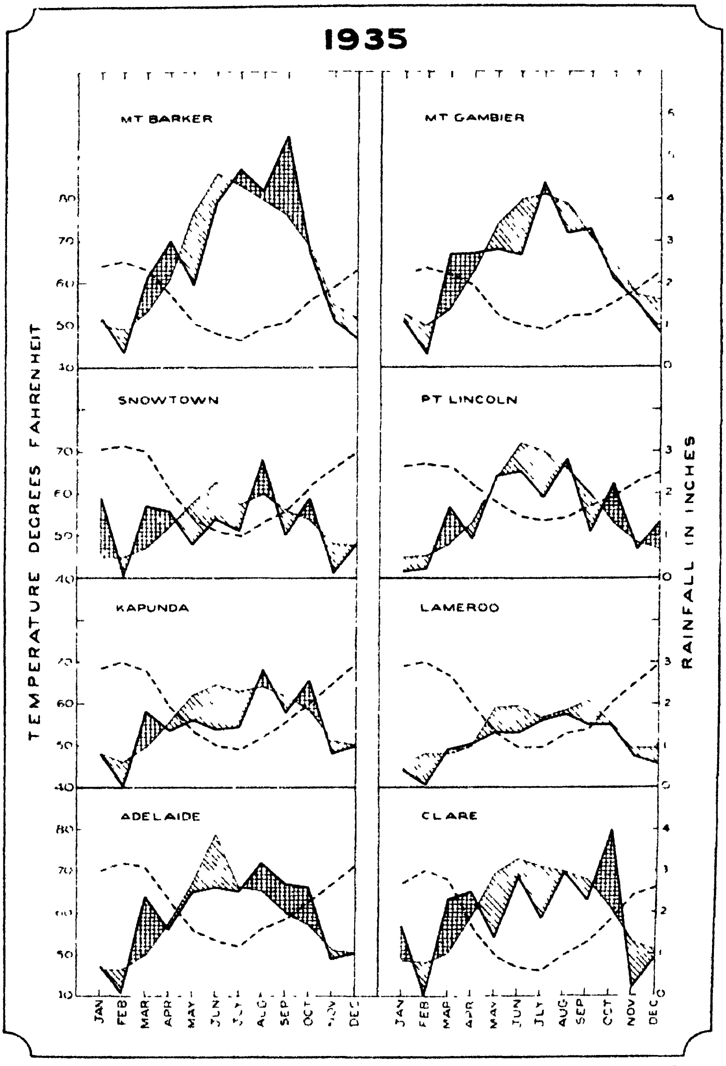


Fig. 1—Shows total rainfall, and mean temperature for each month during 1935, at eight stations in South Australia. Heavy line shows actual rainfall for 1935, plotted month by month; light line shows average monthly rainfall (based on many years' records). Single shading shows rainfall below average, cross hatching above average, for month ———— Mean temperature for each month during 1935.

(¹) Davidson, J.—"Insects Observed on Crops in South Australia During the Period June, 1928, to June, 1930" *This Journal* (1931), *34*, 741-745; *Ditto*, June, 1930, to June, 1932; *ibid.*, *36*, 283-286; *Ditto*, June, 1932, to June, 1934; *ibid.*, *38*, 998-1003.

1935), the present paper contains the monthly rainfall and temperature data for eight representative stations in the State for the periods under review (Figs. 1 and 2).

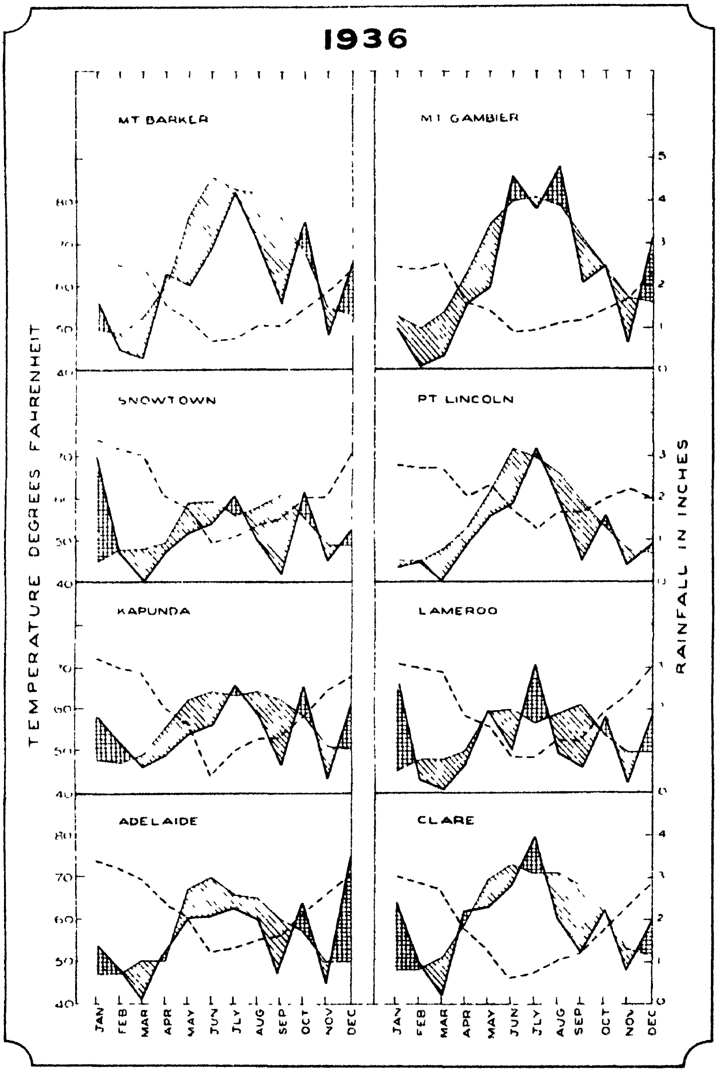


Fig 2.—Shows total rainfall, and mean temperature for each month during 1936, at eight stations in South Australia Heavy line shows actual rainfall for 1936, plotted month by month; light line shows average monthly rainfall (based on many years' records) Single shading shows rainfall below average, cross hatching above average, for month ———— Mean temperature for each month during 1936.

II. Insects in Cereal Crops.

Chortoicetes terminifera Walker (Orthoptera, Acridiidae).—A severe and widespread outbreak of the Black-tipped Locust reached its peak in the early summer of 1934. Reference was made to it in the previous paper of this series (Davidson, 1935, p. 978). Records indicate that the last comparable occurrence was in 1890. Extensive damage to wheat occurred in the northern and western parts of the cereal belt; portions of the adjoining pastoral country also suffered, the sheep-carrying capacity being temporarily much reduced. In addition, some injury occurred to irrigated pastures along the Murray River; the only injury to fruit trees appears to have been at Moorook. The swarms laid eggs extensively within the agricultural areas; these mostly hatched in the autumn of 1935, and the young insects failed to survive the cold, wet conditions. For further details, reference should be made to a paper by J. Davidson (2). Control measures are discussed in another paper (Davidson (3)).

The grasshopper *Austroicetes jungi* Branesik was present in swarming numbers in the summer of 1935, a year after the outbreak of *C. terminifera*, and again during the spring of 1936. By the summer of 1935, swarming phase *C. terminifera* had completely disappeared. *A. jungi* occurred in districts where *C. terminifera* had been present the previous year; its area of distribution in the state was, however, much more restricted than the latter species. The country affected lay along the outer fringe of the agricultural areas; Port Augusta, Quorn, Wilmington, Orroroo, and Peterborough were some of the chief localities where agricultural crops were damaged. Wheat was chiefly attacked, and some barley. An investigation of the biology and ecology of this insect is in progress. There is only one generation annually; the swarming individuals do not exhibit the migratory tendencies of *C. terminifera*. It is probable that *A. jungi* recurs in plague form in the above-mentioned districts more frequently than does the black-tipped locust. It may be added that it is readily distinguished from *C. terminifera* by the absence of the black tip to the hind wing, by yellow instead of red hind legs, and by the bright yellow males (brown in *C. terminifera*).

Desiantha caudata Pascoe (Coleoptera, Curculionidae).—The larvae of this weevil attacked young wheat plants at Riverton in August, 1935, and at Bordertown in September, 1935. Bare patches in the crop, mostly on slopes, were found to result from injury by the larvae to the crowns of the plants. Three or more were found at the base of each affected plant. At Riverton a crop of 70 acres was affected, and at Bordertown, 100 acres; in each case fairly heavy, but patchy, damage was caused. Each piece of land had a similar history, having been seeded with wheat a few weeks after ploughing. Each had been used for a number of years previously, as unimproved grassland, composed chiefly of native grasses. It is probable that the weevil larvae had been feeding on the roots of these plants, and after cultivation turned to the wheat seedlings. A longer and more careful preparation of the seedbed would prevent this. *Desiantha caudata* (Fig. 3) is a native species; the South Australian Museum possesses specimens from all States, except Western Australia.

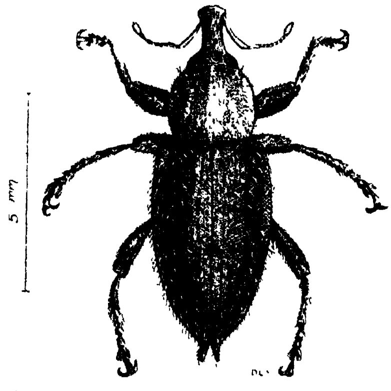


Fig. 3—*Desmantha caudata* **Pascoe**
Adult weevil.

Dasygaster hollandiae Guen. (Lepidoptera, Noctuidae).—Specimens of pupae of this "cutworm" were received from Petina, Eyre's Peninsula, in October, 1934. Our correspondent stated that the larvae had destroyed thousands of acres of wheat and grass. The larvae pupate beneath the soil surface, in hard earthen cells, which can be removed in adherent masses The moths emerged in December; they are dark-brown in colour.

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(2) Davidson, J. (1936).—"On the Ecology of the Black-tipped Locust (*Chortoicetes terminifera* Walk.) in South Australia." Trans Roy. Soc. S. Aust., *60*, 137 152.

(3) Davidson, J (1935).—"Control Methods Used Against Locusts and Grasshoppers." *This Journal*, *38*, 619-624.

Sideridis (= *Persectania*) *ewingi* Wwd. (Lepidop., Noctuidae).—The larvae of this well-known moth were present in experimental cereal plots at the Waite Institute in November, 1934. In a plot of one acre of barley, about 50 per cent. of the heads were eaten off; these were left lying on the ground. The flag was mostly eaten completely. Larvae were commonest in the greener patches within the crop; well-yellowed plants were not attacked. They are dull black with greyish longitudinal stripes. Many were found in loose soil at the base of the plants; the green faecal pellets were commonly present on the soil surface. In wheat, less damage was done, but injury to the flag was common. Even where the infestation was very light, the cutworms were readily detected by the presence of faeces. Control was by means of a poison bait (4) as given in the *Agric. Gaz.*, N.S.W., *15*, 260.

III. Pasture and Forage Crops.

Gryllus servillei Sauss. (Orthoptera, Gryllidae).—The common field cricket (Fig. 4) destroyed patches of pasture at various places in the Penola-Millicent districts in the South-East, during the late summer of 1934-35. The insects were confined to local areas of black silty soil, which is extremely sticky when wet, but which cracks deeply when dry. The presence of crickets appears to be associated with this latter character; the cracks provide the only available shelter for these nocturnal insects. This soil type is confined to depressions, and appears to be produced by deposition of suspended clay from standing water which collects in these situations. The general soil type is light sand, overlying clay. In the black silt soil, damage by crickets was such that many areas were completely denuded of pasture With the advent of the autumn rains, the numbers of crickets quickly declined; the effect of the rain in closing the soil cracks appears to assist this. Regeneration of affected pasture was slow, and the stocking capacity of such land was temporarily reduced. The use of arsenical bran baits, as used for locusts and grasshoppers, or even the modified formula already given against cutworms, will reduce the number of these these insects.

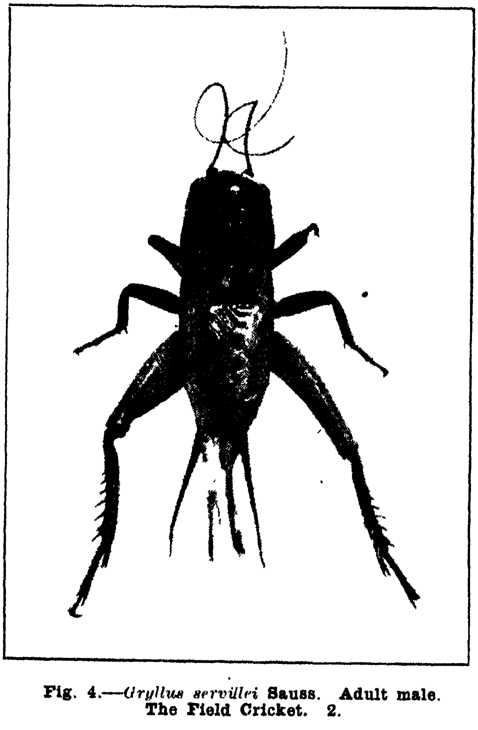

Fig. 4.—*Gryllus servillei* Sauss. Adult male. The Field Cricket. 2.

Oncopera fasciculata Walk. (Lepidoptera, Hepialidae).—At Glencoe, in the South-East, bare patches in pasture in the spring of 1935 were produced by the larvae of this moth. One such area of several acres in extent had no living grass on it. The soil contained numerous vertical burrows lined with coarse brown silk, in each of which a larva or pupa of this moth was found (4th September, 1935). The burrows were, in some places, less than 3in. apart. They penetrated to a depth of 6in., and both larvae and pupae moved actively up and down them. At the time of examination almost all burrows contained pupae. Emergence of moths was just beginning; it takes place in late afternoon and evening. After the emergence, the insects rest motionless on the soil surface,

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(4) Paris green, 1lb.; bran, 24lbs.; water, 3galls.; salt, 8ozs. Make into a crumbly bait and scatter in the afternoon at the rate of 15lbs. per acre.

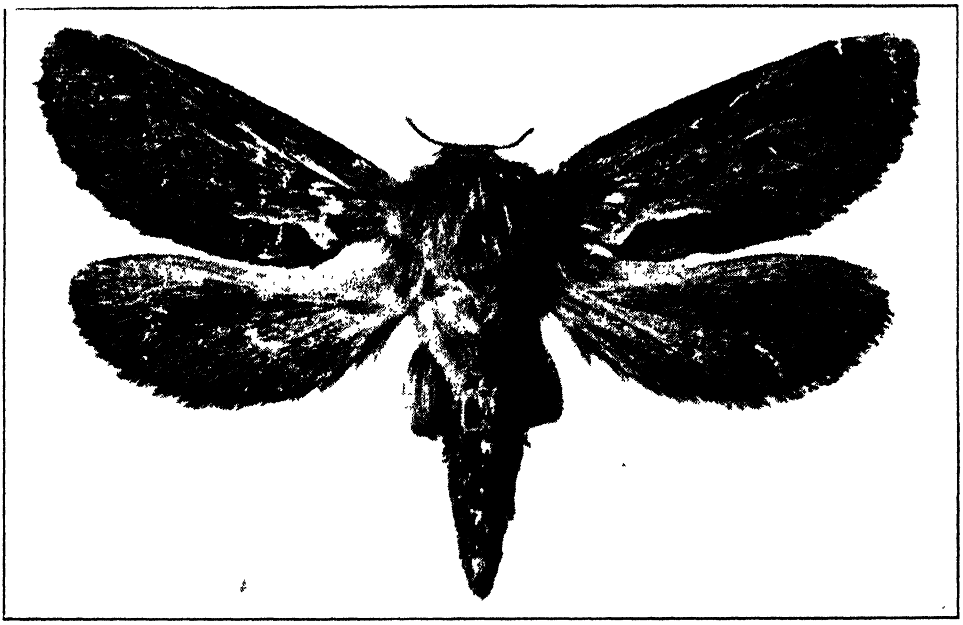

Fig. 5.—*Oncopera fasciculata* Walk. Male. The colour is warm brown. Actual wing-spread, 1·4 inches

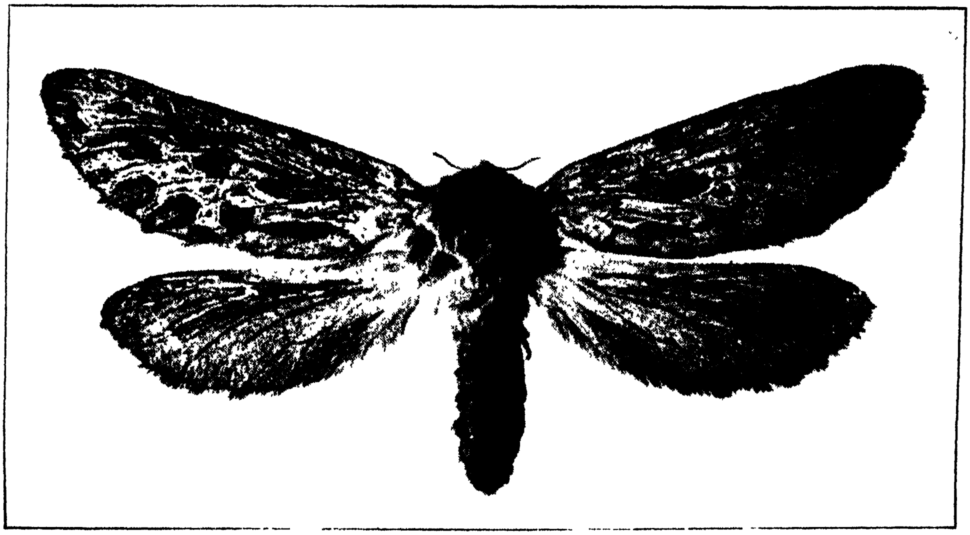

Fig. 6.—*Oncopera fasciculata* Walk. Female. Adult of "grass grub." The colour is grey-brown. Actual wing-spread 1·6 inches

and are very inconspicuous. The males (Fig. 5) have brown wings; those of the females (Fig. 6) are darker, with intricate greyish markings. The emergence period of the moths is a very short one; by 11th September no sign of them could be found. *O. fasciculata* has a restricted distribution in this State, being found in the volcanic soils in the vicinity of Mount Gambier. Known localities are Yahl, Suttontown, and Glencoe. The species extends across western Victoria as far as Melbourne. Two other species of *Oncopera* are destructive to grassland in Australia; these are *O. mitocera* on the Atherton Tableland in Queensland, and *O. intricata* in Tasmania. A valuable paper on the systematics of the genus has been published by N. B. Tindale (5).

The larvae apparently begin feeding in the early autumn, and become mature at the end of winter The damage they do is patchy, and varies considerably from year to year. Thorough cultivation of affected grassland appears to be the best treatment. A lead arsenate spray on the pasture would doubtless give control, provided the area was fenced off, to avoid possible harm to grazing animals.

Aphodius tasmaniae Hope (Coleoptera, Scarabaeidae).—The "scarab grass grub" which damages pastures in the South-East has already been dealt with by the writer (*This Journal*, *37*, 1149-1156). During the two years under review, it has not been widely troublesome. It was reported at Wolseley in September, 1936. It is of interest that about this time it was also reported from Kangaroo Island, a new locality. It was first noticed there in 1935, and increased in the following year, when some damage was done to sown pasture near Kingscote. It is reasonable to expect that the beetle is indigenous to the island, and that the recent increase in pastoral pursuits there has produced conditions favouring an increase in its numbers.

Halotydeus destructor Tucker (Acarina, Penthaleidae).—A general discussion of the Red-legged Earth Mite has already been given by the writer (*This Journal*, *38*, 353-367). During the winter of 1936 it was troublesome at many places in the South-East, particularly in home gardens An area of 25 acres of peas at Port Elliot was much retarded; the young plants were attacked as soon as they appeared above ground. The mite was also reported from Yorketown and various other localities within the 15in. isohyet. The mites are difficult to kill; nicotine sulphate spray (1/800) with soap is useful. Lime-sulphur (1/100) with a suitable wetting agent, may also be used. In view of the importance of weeds as sites for egg laying, weed control as far back as possible from cultivated crops is an essential beginning to control of the mite.

Smynthurus viridis L. (Collembola, Smynthuridae).—The lucerne flea in the past two years has not been generally common. The winter of 1934 was an unusual one; the outset of the rains was delayed from the usual time (April) until August. Under the dry conditions and low temperatures of midwinter, only a very small population of flea developed; thus little damage resulted in the spring when conditions became favourable By the beginning of summer, when the flea dies out, the population was still much below its normal level, and a reduced number of oversummering eggs were laid. This affected the flea population in 1935, when it was again small. In June, 1935, permanent pastures, lucerne, and seedling oats were damaged at the River Glen settlement on the Murray River. At Wood's Point Station, adjacent to River Glen, control of lucerne flea in pasture is obtained by the use of lime sulphur (1/60) applied with a power spray (see J. Davidson, 1933, *This Journal*, *36*, 994-1006). A small area of tick beans used as a green-manure crop in a vineyard at Reynella was damaged in June, 1936. The position regarding the predatory mite *Biscirus lapidarius* Kr., is discussed in the Report for 1933-1936 of the Waite Agricultural Research Institute, page 55. This mite has been found to occur naturally at Kybybolite and at Tweedvale.

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(5) Tindale, N. B. (1933).—"Revision of the Australian Ghost Moths (Lepidoptera Homoneura, Family Hepialidae), Part II." Records S. Aust. Mus. *5*, 13-43.

HELIOTHIS ARMIGERA HB. (LEPIDOPTERA, NOCTUIDAE) AND SEED-SETTING IN LUCERNE.

In the Booborowie district in the Upper North, lucerne-growing is made possible in an area of low annual rainfall (17in.) by the presence of adequate subsoil water. The lucerne is cut three or four times during the summer, after which the plants are usually allowed to run to seed. In the summer of 1934-35 the setting of seed in this district was abnormally low; the failure was attributed by growers to the presence of the larvae of the above moth, which feed on the inflorescences of the plants. An examination of the affected areas was made by Mr. C. M. Donald, an agronomist of the Waite Institute, in company with the writer, in March, 1935. It appears that in mid-January, 1935, the lucerne was in full bloom, and a good crop expected. Within three days the majority of the flowers had fallen, only the bare axis of each inflorescence remaining. On the flower heads that were present at the time of examination, larvae of *Heliothis* were present in varying numbers, the average on 10 plants being 4; the highest number per plant was 12. The larvae consume almost completely the buds and flowers on an inflorescence. The small blue butterfly *Zizina labradus* Godart, was also common in the lucerne, and its green slug-like larvae were not uncommon on the flowers. Their damage is characteristic; a neat round hole is eaten through the calyx or base of the corolla, the ovary being completely removed. The impression was gained that, though appreciable damage was done by these insects, the remaining flowers were sufficient to provide a normal seed crop, if they had developed in a normal way. In January, 1931, the same area had been visited by Dr. J. Davidson following a similar failure of the seed crop. He found the larvae of *Heliothis* in very small numbers, and concluded that other causes were responsible for the position.

It is known that successful seed setting in lucerne depends upon a number of factors in the physical environment of the plant. For instance, the turgidity of the floral structures, and the temperature and moisture-content of the surrounding atmosphere influence the explosive "tripping" mechanism by which cross-pollination is effected. Further, conditions of excessive dryness may hinder the growth of pollen tubes from the germinating pollen on the stigma; when this happens, fertilisation does not take place. Dwyer states (6) "Although lucerne can be grown successfully under many different climatic conditions it is well known that climate is a limiting factor in the production of seed. For this reason, lucerne seed production on a commercial scale is confined to certain districts, but even in these districts the seasonal weather conditions and other factors play a large part in determining the actual yield of seed." The meteorological records for Booborowie show that for the four days, 20th-23rd January, 1935, the maximum temperatures were 93, 95, 100, 105° F. The degrees of infestation of the crop with the larvae of *Heliothis* and *Zizina* was not sufficient to account for the large flower fall; the foregoing considerations suggest that in this season unsatisfactory environmental conditions, rather than insect injury, were responsible for the failure of the crop to set a normal seed harvest.

IV. Fruit Crops and Vines.

Monolepta divisa Blkb. (Coleop., Chrysomelidae).—This beetle is a common pest of immature grape clusters; it was reported in November, 1934, from Warcowie.

Nysius vinitor Berg. (Hemiptera, Lygaeidae).—In October, 1935, vines at Morphett Vale were wilted by fifth instar nymphs of this bug—five vines only were affected—after the vineyard had been cultivated; it is probable that the insects deserted some weed host for the vines.

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(6) Dwyer, R. E. P. (1931).—"Seed-setting in Lucerne: Some Observations on the Controlling Factors." *Agric. Gaz.* N.S.W., *42*, 703. I am indebted to Mr. C. M. Donald for this reference and for permission to quote from a report made by him on this subject.

Tortrix postvittana Walk. (Lepidoptera, Tortricidae).—The "light-brown Apple Moth" is fairly common in gardens in the suburbs of Adelaide during the summer months. Larvae are often found in "split-stone" fruits of apricot, nectarine, and peach.

Cubicorrhynchus maculatus Macleay (Coleop., Curculionidae).—Specimens of this weevil were received in March, 1935, from Woodchester, near Strathalbyn. They had caused damage to the roots of several newly-planted almond trees. Three months after planting, three young trees gradually withered and died. The lateral roots had been eaten away, and four beetles were found in channels that had been cut in the taproot of one tree. This weevil is a native species, and has not previously been met as an insect of economic significance. Its presence as a feeder on almonds is probably fortuitous.

Diphucephala colaspidoides Gyll. (Coleop., Scarabaeidae).—The adults of this small scarab are bright, metallic green in colour; they are naturally associated with various native shrubs and trees, on the foliage and blossom of which they feed. Many species of *Acacia* and Myrtaceous plants such as *Leptospermum* are favoured food plants. The larvae are grass feeders; the adults may occur in enormous numbers in the spring. The species seems to be confined to the cooler and wetter part of the State; it is common in the South-East. It is popularly known in Victoria as the "Cherry Green Beetle." The beetles attack the foliage and flowers of various orchard trees, particularly cherry, plum, and apple. In this State the chief damage appears to be done in the South-East. In November, 1934, apple and plum trees were attacked at Kalangadoo; in some instances trees were completely denuded of foliage. The beetle is often numerous in the Myponga-Mount Compass district; in November, 1936, it swarmed on the blossom of *Lepstospermum scoparium* Control on fruit trees is readily obtained by use of lead arsenate sprays.

V. Shade and Forest Trees.

Eriosoma lanuginosum Hartig (Homoptera, Aphididae).—The Pear Root Aphis has already been reported from this State as a pest of pear (see Davidson, *This Journal*, 32, 798). The wingless parthenogenetic females live on the roots of pear trees. Successive generations occur throughout the year in these situations In the autumn, winged forms also appear on the pear roots. These are known in Europe and elsewhere to migrate to certain species of elm, where overwintering eggs are laid. In the spring, "cockscomb" galls (Fig. 7) are produced on the elm leaves, by female aphids which hatch from the overwintering eggs, and by their offspring. Eventually winged forms develop which migrate back to the pear. At the end of 1935 galls of this type were obtained for the first time in South Australia, from Bal-

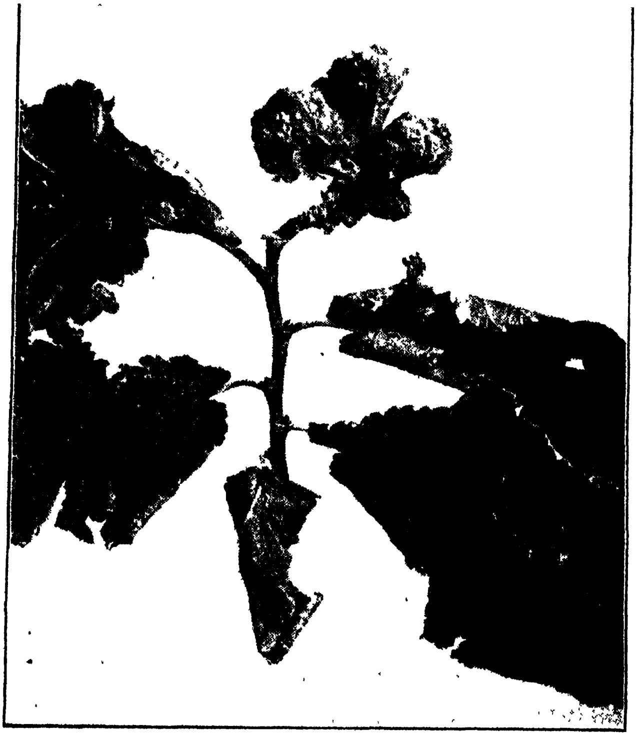

Fig. 7.—Gall produced by *Eriosoma lanuginosum* (Pear root aphis) on elm (*Ulmus ? hollandica*).

hannah, by Dr. Davidson. The species of elm involved was probably *Ulmus hollandica.*

Cardiaspis vittaformis Froggatt (Homoptera, Psyllidae).—This insect lives in the nymphal stages beneath a characteristic fan-shaped lacy scale, on the leaves of various species of *Eucalyptus.* It was first described by Froggatt (7) from New South Wales; he states that one year it appeared in enormous numbers on the foliage of "iron-bark gums" (*Euc. ? paniculata*) at Wingham, New South Wales, where it was reported to be destroying forest foliage over a large area. In May, 1935, the same species was found damaging the leaves of Red Gum (*Euc. rostrata*) near Naracoorte, in the South-East of this State. In April, 1936, Red Gum trees through parts of the Mount Lofty Ranges, and in the suburbs of Adelaide, showed marked evidence of damage caused by this insect; the tests of the young Psyllids were present in great numbers on almost every leaf, which withered and died in patches about the scales. The trees after a time appeared to have been scorched by fire, and many of the leaves fell off. However, new leaves grew during the following summer, and trees which were apparently dead completely recovered. It may be noted that the Red Gum is, so far, the only Eucalypt in South Australia on which these insects have been observed to live. The factors which cause fluctuations in the numbers of this Psyllid are not known; it is clear, however, that it may occasionally reach large numbers in a particular locality, when transient damage to affected trees results. It may be added that at the time of writing a residual infestation is present on certain of the trees affected last year. Adult Psyllids are present in great numbers on these trees.

Cerococcus punctiferus Green (Homoptera, Coccidae).—This scale insect was originally described from *Pittosporum eugenioides* in New South Wales (8). It is occasionally found in suburban gardens in Adelaide, on the ornamental shrub and hedge plant, *P. undulatum.* It clusters thickly on the twigs. The scales are rounded and dark, with a few short tufts of whitish wax filaments. Specimens of this scale were received from Glenelg in June, 1935.

Aspidiotus rossi Maskell (Homop., Coccidae).—This widespread scale is common on many host plants around Adelaide. It was received in December, 1934, from Carob bean (*Ceratonia siliqua*).

Diadoxus erythrurus White (Coleoptera, Buprestidae).—This native beetle is called by Frogatt (9) the "Cypress Pine Girdler" from the habit of the larva in working under the bark of the Native Cypress pines (*Callitris* spp.). In the parts of Australia where these pines grow, introduced cypress pines are likely to be attacked by the larvae of this beetle, with usually more serious results than are seen in *Callitris.* The ornamental tree most commonly attacked is *Cupressus macrocarpa;* during the period under review, reports of damage to hedges of this plant have come from places as far apart as Alice Springs, Booleroo Centre, and Reynella.

Otiorrhynchus cribricollis Gyll. (Coleop., Curculionidae).—This weevil is popularly known in this State as the "curculio beetle." It is a common pest of many garden plants and fruit trees. The adult beetle varies in colour from light brown almost to black; the surface is broken by lines of small depressions. They are nocturnal feeders; by day they hide under debris and loose soil at the base of their food plants. They cannot fly; at night they climb the plants and produce characteristic feeding injury (Fig. 8). They are active in spring and summer. In the suburbs of Adelaide the plants attacked include apple, plum, almond, olive, and rose. Lucerne and vines are damaged in some localities.

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(7) Froggatt, W. W. (1923).—"Forest Insects of Australia," N.S.W. Govt. Printer, p. 74.

(8) Frogatt, W. W. (1927).—"A Descriptive Catalogue of the Scale Insects of Australia," Part 2, p. 60. Science Bull. No. 18, N.S.W. Dept Agric.

(9) Froggatt, W. W., "Forests Insects of Australia," p. 159.

Eggs are laid in the autumn, and the larval stage occurs during the winter, from May to October. This stage is spent beneath the soil; the grubs feed on the roots of a great many plants, including weeds. They pupate in October, and the first adults appear in November. Illustrations of typical damage and a list of food plants are given by A. M. Lea (*This Journal 30*, 585-588). Valuable accounts of life-history and control are given by H. G. Andrewartha. (10) He finds that efficient control may be obtained by the use of a poison bait consisting of minced dried apple, 9lbs., to 1lb. of sodium fluoride. The bait should be scattered on the soil close to plants that are being attacked; application should be made as soon as feeding injury by the insects become apparent, which is usually at the end of November.

A case of damage by the larvae of this beetle to roots of young ash trees was seen in November, 1936. A plantation of such trees in a nursery at Adelaide failed to make normal growth: examination showed that the roots were much injured by the larvae. The trees were stunted, and their main roots were scored and channelled (Fig 9). In the soil about them numerous fully-grown larvae were found, and also pupae in earthen cells. Every tree in several hundreds appeared to be affected. The previously-mentioned poison bait was used for control with the object of killing beetles as they emerged from the soil. Lea (*loc. cit.*) records similar damage by the larvae of *O. cribricollis* to the roots of apple trees at Penola.

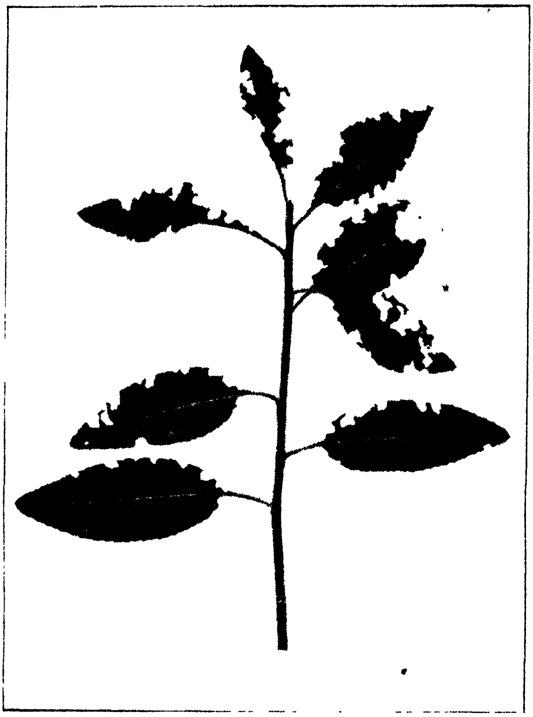

Fig. 8.—Feeding injury to leaves of almond by adults of *Otiorhynchus cribricollis* Gyll

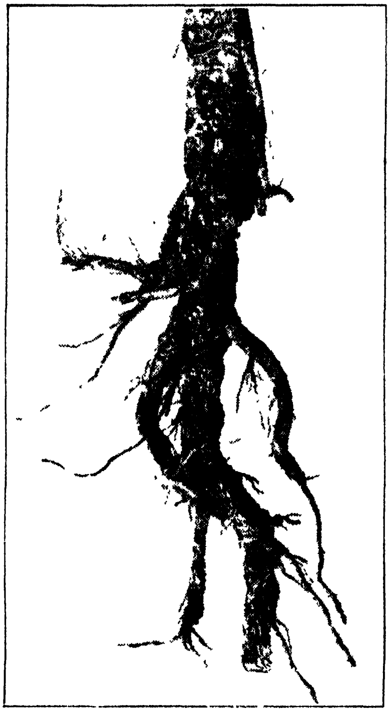

Fig. 9.—Damage to roots of young ash tree (*Fraxinus*) by larvae of *O. cribricollis*.

Hyalarcta nigrescens Doubleday (= *Animula herrichi* Westw.) Lepidop., Psychidae).—Specimens of the "Ribbed case moth" were forwarded from Laura Bay, where they were damaging the foliage of Tuart (*Eucalyptus gomphocephala*).

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(10) Andrewartha, H. G.—(1) Bull. Ent. Res. *24*, 373-384; (2) *J. Dept. Agric.*, W. Aust., *8*, 106-114.

VI. Medical and Veterinary.

Echidnophaga gallinacea Westw. (Aphaniptera, Dermatophilidae) Poultry Stickfast Flea).—This flea (Fig. 10) has been known in Western Australia as a pest of poultry since about 1920, though its history there is certainly older. (11) It is widespread in the tropics, in Africa, and in Southern U.S.A. The first record of its presence in South Australia was when Ferguson reported it from Ooldea in 1922. (11) It has ultimately reached the settled parts of this State *via* the transcontinental railway, in spite of restrictions on the introduction of poultry from Western Australia (Quarantine Proc. No. 153, *Commonwealth Australia Gaz.*, Melb., 21/1/1926). It was first found on poultry at Port Augusta in August, 1933. The flea has now spread along the coastal area between Port Augusta and Port Pirie; it also occurs at Mount Mary, and at Morgan and Waikerie on the Murray River. Other localities are Port Adelaide, Two Wells, and Salisbury. I am indebted to Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S., Deputy Chief Veterinary Officer, South Australian Stock and Brands Department, for the foregoing information regarding date of introduction, and present distribution, of stickfast flea in this State.

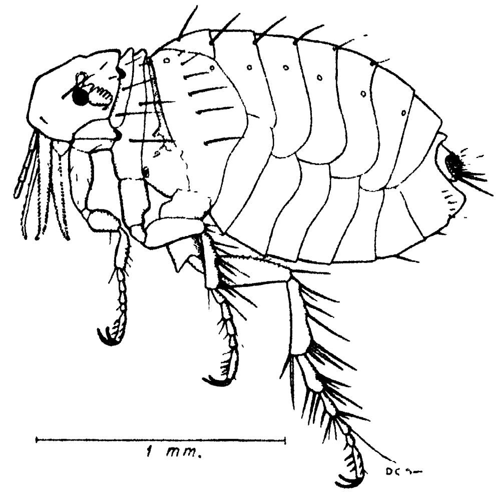

Fig 10 —*Echidnophaga gallinacea* Westw. (Poultry stickfast flea). Female Note serrated mandibles which enable permanent attachment to host

E gallinacea is, in particular, a pest of poultry; other common hosts are cats, dogs, and rats, and less commonly horses, cattle, and man. On poultry, the fleas attach themselves in masses on the bare areas of the head; they rarely attack the surfaces of the body that are covered with feathers. Their presence in large numbers on birds causes loss of condition, which results in decreased egg production; young birds may be killed by a heavy infestation. The fleas remain permanently attached to their hosts; females may live as long as 40 days. The small, rounded eggs fall to the ground; most are laid at night while the birds are perching. The larval stage is passed in debris on the floors of poultry houses. The larvae require a damp, but not too wet environment. Their food consists of the faecal pellets of partly-digested blood which fall from the adult fleas. They require a fairly loose, light soil; stickfast fleas are most abundant on sandy soils. The larvae pupate in the soil; under favourable conditions the life-cycle takes about one month (Campbell, Bull. No. 104, Dept. Agric., W. Aust., 1923). The adult fleas are present during the spring, summer, and autumn; the winter is bridged by the egg and pupal stages.

Control of the stickfast flea lies in fowlyard sanitation. Experience in Western Australia has shown that cementing the floors of fowlhouses and removal of droppings twice weekly gives effective control of the flea; by this method breeding places are eliminated. The same attention must be given to nesting boxes. For a discussion of this see Richardson (*J. Agric.*, W. Aust., *2*, 209-210, and Newman and Shaw, *ibid.*, *13*, 324-328). Movable houses which are shifted once weekly may be used; flea larvae die in soil that has been dried out by exposure to sunlight. Flooring material may be kept free of larvae by keeping it constantly wet, or by regular treatment with kerosene or other oil. Cats and dogs, which spread the stickfast flea, should be excluded completely from the vicinity of poultry yards. Fleas attached to birds or animals are readily killed by application of oils such as castor, olive, or neatsfoot oil.

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(11) Ferguson, E. W. (1922).—"Australian Fleas," in 13th Report Microbiological Lab., N.S.W.

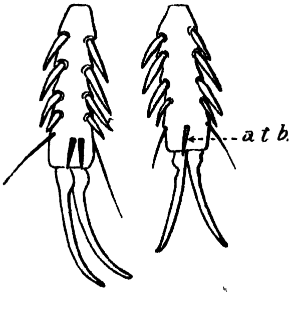

Fig. 11.—Tarsi of hind legs of *Echidnophaga gallinacea* (left) and *E. myrmecobii* (right). The former has two, the latter one, apical tarsal bristle (a.t.b.).

E. gallinacea is often confused with a closely-related native species, *E. myrmecobii* Roths., which is normally associated with such marsupials as the common opossum (*Trichosurus vulpecula*). *E. myrmecobii* is frequently found attached in small numbers to the muzzle and ears of cats and dogs; it is not a pest. It is best distinguished from the poultry stickfast flea by the condition of the apical tarsal bristles (see Fig. 11).

Pulex irritans L. (Aphaniptera, Pulicidae).—Specimens of this flea were received in July, 1934, from a farm at Kooringa, where they were numerous in animal houses and a nearby dwelling. Pigs, cows, and poultry were kept in the outbuildings, the fleas breeding in litter on the earthern floors. Control lay in removal of debris, cementing the floors, and spraying them with kerosene. This flea is fairly common in similar situations in other parts of the State.

The flea *Ceratophyllus fasciatus* Bosc. was taken from a rat at Adelaide, June, 1934.

The sheep nasal bot fly *Oestrus ovis* L. is a common pest of sheep in this State. Specimens of the adult fly were received in March, 1936, from a correspondent at Murraytown, who stated that each summer large numbers of them congregate along the walls of the farmhouse.

Simulium ornatipes Skuse (Diptera, Simuliidae).—In January, 1934, larvae of this species were found in a small stream at Waterfall Gully, near Adelaide; they were attached to stones and leaves in running water. In the same month, larvae and pupae were found at Salter's Springs, on the River Wakefield; they were attached to rocks in cascades, in great numbers. The water of this stream was brackish to the taste at this time. The only available analysis of Wakefield River water, made in March, 1915, by the Government Department of Chemistry, gave a value for the total salts of 270 grains per gallon (4 grams per litre). Although larvae were so common, adults could not be found. Larvae were again found in May, 1934, attached to stones in a small stream at Glen Osmond. Adults were bred from these. The immature stages of *S. ornatipes* have been well figured by Drummond (*J. Roy. Soc.*, W. Aust., *18*, 10). The species is known from both Eastern and Western Australia. The writer has found no previous record of Simuliids in South Australia, except for a note by Lea (1917, Trans. Roy. Soc. S.A., *41*, 663). There is no evidence in this of actual identification, and it is much more likely that, in the locality mentioned, Chironomidae were involved. *S. ornatipes* is not known to attack man. Some of the flies obtained locally were placed on the skin of the forearm; they made numerous attempts to bite, but appeared to be unable to pierce the skin.

Pediculoides ventricosus Newp. (Acarina, Pediculoididae).—This widespread mite causes a skin itch of agricultural workers which is known in South Australia as "hay itch." The position in this State has been discussed by the writer in two papers. ([12]). Further reports of its presence have since been received from Strathalbyn, Pooraka, and Adelaide. It appears to be distributed generally throughout the cereal belt.

([12]) Swan, D. C. (1934).—"The Hay Itch Mite (*Pediculoides ventricosus*, Newport), in South Australia." *This Journal*, *37*, 1289-1299.

Swan, D. C. (1934).—"Dermatitis Caused by a Mite (*Pediculoides ventricosus*) and Its Occurrence in Australia." *Medical J. of Aust.* (1934), 573-578.

Trombicula hirsti Sambon (Acarina, Trombidiidae).—This mite (Fig. 12) also produces a painful skin irritation of man; in South Australia it is known as "tea-tree itch." The mite is associated with an area of swampy coastal country in the South-East, extending from Robe towards Mount Gambier, of which the dominant tree is "tea-tree" (*Melaleuca* spp.). The soil is damp in summer, and swampy in winter; it supports a fairly close covering of such plants as *Acaena sanguisorbae* and the halophytes *Salicornia* and *Arthrocnemum.* The larval Trombids swarm among this vegetation in the summer months; the adult stage is at present unknown. The mites readily reach the human skin through ordinary clothing; their bites, which produce small raised areas, become apparent after about 30 hours, and itch severely for several days. The natural hosts of the larvae are at present unknown; rabbits (*Oryctolagus cuniculus*), rats (*R. lutreola*), wombats (*Phascolomys*), and certain other small marsupials are present in the vicinity of the swamps. This mite is also known from Northern Queensland; a description of it is given by S. Hirst (1929) in Trans. Roy. Soc. S. Aust., *53*, 24-26, and by H. Womersley (1934) in Records S.A. Museum, *5*, 212.

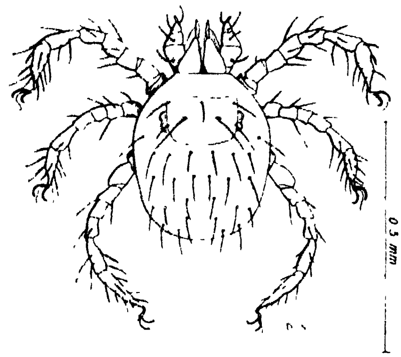

Fig. 12.—*Trombicula hirsti* Sambon. Larva "Tea-tree itch" mite

VII. Miscellaneous Observations.

The tulip aphis (*Anuraphis tulipae* Fonsc.) was found on tulip bulbs imported from Victoria in March, 1935.

The common "spittle insect," *Bathylus albicinctus,* was forwarded from Millbrook Reservoir, where it was infesting St. John's Wort (*Hypericum perforatum*) in numbers, in November, 1934.

The beetle *Euspermophagus sericeus* Geoff. (13) (Fam. Bruchidae) was found infesting the seeds of *Convolvulus arvensis* that were present as an impurity in beet seed, imported from New Zealand in December, 1934.

Lonchaea aurea Macq. (13) (Diptera, Lonchaeidae).—This small metallic-green fly was bred from the stems of kale (*Brassica oleracea,* var.) in which the larvae were tunnelling. It appeared to be the primary cause of the damage, and not secondary to any fungal infection. This species is known in Australia to cause damage to the fruits of tomatoes; the name *L. splendida,* Loew. has been applied to it, but is a synonym of *L. aurea* (*vide* Bezzi, Diptera of Fiji, Brit. Mus., 1928).

Mushrooms grown commercially in an old railway tunnel near Adelaide were infested by a Tyroglyphid mite, apparently *Tyroglyphus lintneri* Banks. The Collembolan *Hypogastrura armata* Nic. also damaged the mushrooms.

The prickly pear, *Opuntia monacantha,* has long been present as a hedge plant at various localities in this State. Under local climatic conditions it does not spread, but is found as hedges or small clumps. In a few cases the pear has straggled to some extent; it may at times reach a height of about 12ft. At Pooraka, 10 miles north of Adelaide, a hedge about half a mile long was planted about 60 years ago. This has made slow lateral growth and is now 10yds. to 20yds. wide, very tall and dense. The owner of the land on which the hedge occurs, Mr. W. A. Tough, obtained supplies of cactus-feeding insects from the Commonwealth Prickly Pear Laboratory at Sherwood, Queensland, through the Officer-in-charge, Mr. A. P. Dodd. Eggs of the Cactus-moth, *Cactoblastis*

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(13) These insects were kindly identified by Mr. A. L. Tonnoir, Division of Economic Entomology, C.S.I.R., Canberra, F.C.T.

cactorum, were received in February, 1934, and a small consignment of the Indian Cochineal, *Dactylopius indicus* Green, in May, 1934. The eggs of the former hatched and larvae could be found for about a year; after that they apparently died out. It is probable that winter temperatures were too low for their survival. The cochineal insect, however, established itself and spread from the sites at which it was first placed out. In January, 1935, there were isolated colonies; in February, 1936, the insect was densely established over portions of the hedge. The plants had collapsed and shrivelled at a number of places. The process appeared to be extending and the scale to be thriving (Fig. 13). At this time males were in flight in great numbers. (¹¹)

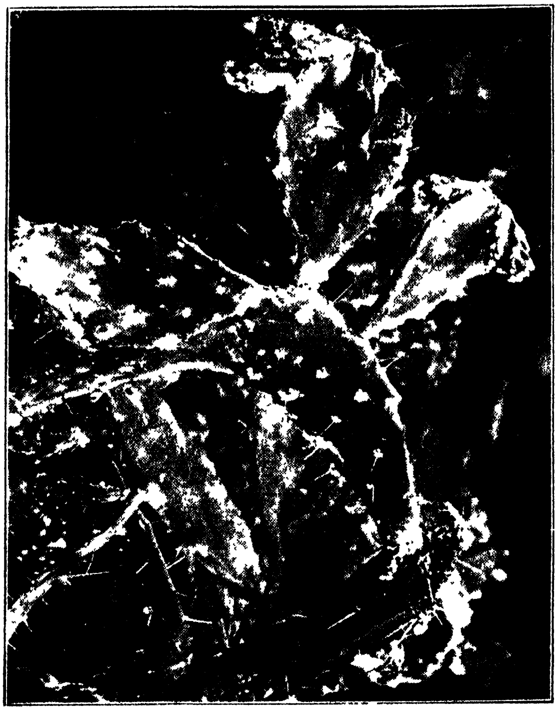

Fig 13.—Groups of cochineal insects (*Dactylopius indicus* Green), on cactus *Opuntia monacantha*. The cactus ultimately becomes yellow in colour, and shrivels. Early stages of this process may be seen in figure.

Roeselia lugens Walk. (Lepidop., Nolidae).—The larvae of this moth were common during the spring of 1936 in the vicinity of Adelaide on the leaves of *Eucalyptus cladocalyx* (Sugar Gum) and *E. rostrata* (Red Gum). The leaves are eaten irregularly from the margins to the midrib. The young larvae are somewhat gregarious; they eat over the leaf surface until only the vascular skeleton is left. The larvae are yellow spotted on a brown background. Some of the yellow spots are tubercules from which tufts of grey hairs arise; the lateral tufts are very long. A characteristic feature of these larvae is a helmet-shaped mass carried on the head; it consists of the head capsules from previous moults, arranged serially, with that of the first instar on top. The remainder of each exuvium is found attached to the surface of the leaf on which the larva had been feeding. The adult moths are small and grey-brown in colour; they emerge in considerable numbers in late summer, when they fly to lights. A second generation follows in the autumn. French (*Destructive Insects of Victoria*, Part V., p. 118) figures this insect; Froggatt (*Forest Insects of Australia*, p. 66) describes a related species, *Nola metallopa* Walk. The latter name was used by Davidson (1931) in referring to *R. lugens* in South Australia.

VIII. Slugs and Snails.

All the species of snails of economic significance in South Australia appear to be introductions, usually from the Mediterranean region. The large garden snail (*Helix aspersa* Müll.) is common in the suburbs of Adelaide, where it

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(¹¹) For further details of the progress of insect control of this cactus, reference should be made to an article by R. C. Scott, *This Journal*, 40, 401-410.

attacks most garden plants. In September, 1935, it was noted swarming on almond trees to a height of 12ft.; it attacked the leaves. This is a grey-brown species, with brown marbling, up to 1½in. in height.

Euparypha (*Helix*) *pisana* Müll. is a coastal species, common in the South-East. In the vicinity of Robe and Mount Gambier it is often seen massed on fence posts. It passes the summer in this dormant condition, becoming active again with the onset of the winter rains.

Cochlicella acuta Müll. (Syn. *Helicella ventricosa* Müll.) is a small slender brown snail about ⅜in. long, which is becoming widespread in the moister parts of the State. It was first noted in 1926. It is an introduction from the Mediterranean region, and it feeds on many plants.

Helicella ericetorum Müll.—This is one of the so-called "English sheep snails"; it is becoming common on Yorke Peninsula. A correspondent from Warooka stated that it climbed the standing wheat (presumably to aestivate), and that it was collected in great numbers in the harvesting machinery, causing a very unpleasant smell. The shell is rather flat, up to half an inch in diameter, and white in colour, with a slender, brown stripe following round the upper surface.

The slug *Limax maximus* Müll. was collected at Inman Valley in June, 1933; a newly-sown area of some eight acres of mixed pasture (oats, subterranean clover, and rye grass) had been completely destroyed (see *This Journal*, *36*, 1379). This is a widely-distributed omnivorous slug, which may attain a length of 5in. or 6in. when adult; it is commonly called the Great Grey Slug.

Snails and slugs are noctural feeders, and are particularly active after rains. The most effective control at present known appears to be obtained by the use of copper sulphate, either as a spray or a dust. Newman (*J. Agric.*, W. Aust., *1*, 389) advises the use of a 3 per cent. solution in water (equivalent to 3ozs. copper sulphate to 6¼galls. water). As a dust he uses 1lb. of finely-powdered copper sulphate to 14lbs. of slaked lime. In a useful paper on slugs and snails, W. Stewart MacDougall (Trans. Highland and Agric. Soc., Scotland, *45*, 145) recommends a somewhat weaker mixture (5lbs. per cwt.) of copper sulphate, mixed with a fertiliser; for example, a nitrogenous or phosphatic fertiliser may be used. It should be noted that copper sulphate is injurious to foliage, and when using it, plants should be avoided.

The introduced snails and slugs are dealt with by Cotton in a paper in the *S.A. Naturalist*, *16*, No. 4.

IX. Acknowledgments.

In the preparation of these notes, assistance has been received on various points from a number of persons, whose help is gratefully acknowledged. A number of the insects mentioned were identified by Mr. H. Womersley, Entomologist at the S.A. Museum. Mr. B. C. Cotton, Conchologist at that institution, kindly supplied information regarding the names and synonymy of snails. Dr. J. Davidson and Mr. H. G. Andrewartha of this Institute read through the manuscript, and provided many helpful suggestions. Many of the records were brought to notice by district officers of the State Agricultural and Horticultural Departments. In this connection the assistance of Mr. E. S. Alcock, of Mount Gambier, is acknowledged. The weather diagrams were prepared and drawn by Miss H. M. Brookes, and the photographs made by Mr. A. D. Cocks, of this Institute.

Notes on Plant Diseases in South Australia during the Two-Year Period, 30th June, 1936

[By D. B. ADAM, B.Agr.Sc., Plant Pathologist, Waite Agricultural Research Institute, University of Adelaide.]

In preparing the following notes the writer has been assisted by the Chief Horticulturist, who kindly made available monthly statements prepared by local Horticultural Advisers regarding the current plant disease situation in their districts.

An outbreak of tomato leaf mould in glasshouse-grown tomatoes, apparently the first to occur in this State, was a noteworthy feature in the plant disease situation in the period under review. An account of this disease, together with information on control measures, was given in this *Journal*, vol. 39, p. 604-5.

Experience gained by growers during the current season has emphasised the importance of management methods, designed to keep the humidity in houses as low as possible. Spraying, and to a lesser extent dusting treatment to control "Leaf mould" have been widely employed, but satisfactory evidence as to the value of these treatments has not yet been secured. Of the other diseases affecting tomatoes, "Early blight," sometimes referred to as "Black spot" (*Macrosporium solani*), is of some importance, especially early in the season in houses of faulty construction.

Root diseases occur fairly commonly in glasshouse-grown tomatoes. Of these diseases "Verticillium wilt" is probably the most important, though "Fusarium wilt"? (*Fusarium lycopersici*) is apparently extending, and where it occurs causes severe loss. "Black dot disease" (*Colletotrichum atramentarium*) is probably more widespread and damaging to tomatoes than has been suspected.

English methods of control for "Verticillium wilt," viz., the artificial raising of the temperature in the glasshouse, are inapplicable locally, as the houses are not artificially heated, and the necessary control cannot be exercised.

The economic importance of these diseases to the industry warrants their more complete investigation with a view to exercising more control than has been attained hitherto. Eelworm ("Clubroot") (*Heterodera marioni*) is also common on the alluvial soils along the Torrens River.

Vegetables.

"Irish blight" of potatoes (*Phytophthora infestans*) threatened to assume some importance in early potatoes in 1935, but was checked by dry weather in late November. "Celery blight" (*Septoria apii*) is commonly present, but does little damage where, as is commonly the case, routine spraying with Bordeaux mixture, is adopted. "Soft rot," a bacterial disease (*B. carotovorus*) described locally as "Brown" or "Black heart," occurs quite commonly towards the end of the season, and is occasionally troublesome to celery in transit. Early in the season, especially after a warm, dry spell, a similar soft rot, with the advanced stages of which a bacterium is associated, also occurs. The factors leading to the development of this form of the disease await a closer study.

"Black rot" (*B. campestre*) was prevalent on a "greenleaf" cauliflower grown under a sprinkler irrigation system. Ordinary "blue-leaf" varieties growing alongside remained free from infection.

A severe outbreak of "streak" (tomato spotted wilt virus) was found in a bed of green garden peas grown immediately after a crop of tomatoes. "Smudge" (*Colletotrichum circinans*) on white-skinned onions, and a severe localised outbreak of pumpkin anthracnose (*Colletotrichum lagenarium*) were also recorded.

Ornamental Plants.

Two outbreaks of tulip "fire" (*Botrytis tulipae*) were recorded. In each case the source of infection apparently was a newly-introduced stock of bulbs. In suburban gardens, cinerarias, zinnias, and iceland poppies suffer considerably from infection with the tomato spotted wilt virus. Rusts on hollyhocks (*Puccinia malvacearum*) and calendulas (*P. calendulae*) are very common diseases. Occasionally antirrhinums and asters are affected by a crown rot associated with a pythiaceous fungus. The trouble is generally related to over generosity in watering, especially on retentive soils.

Orchard Trees and Vines.

"Apple scab" (*Venturia inaequalis*) was much more prevalent in 1935-6 than usual, a fact which was undoubtedly due to the occurrence for unusually long periods of weather suited to the disease. In some districts not generally troubled with this disease the remedial measures taken were applied too late, and consequently losses occurred.

"Silver leaf" (*Stereum purpureum*), principally a disease of the plum, but occasionally affecting apricots, peaches, and apples as well, has become so general in parts of the hills district, that the Department of Agriculture has framed regulations designed to check this disease. The creation of a community conscience alive to the necessity of thoroughly eradicating trees dying or dead from this disease is very desirable.

The "Gummosis" or "Dieback" disease of apricot, which occurs throughout the apricot districts of the State, and was described in the last summary, has been a subject of study for the last two years, and it is intended to prepare soon a progress report on this disease.

"Apricot scab" (*Coryneum beijerinckii*) in the 1934-5 season was reported to be worse than usual in the Clare and metropolitan districts. In many districts in South Australia where it is necessary to spray to control "scab" only one spraying, *i.e.*, at the "pink" stage in spring, is given. This practice in many years gives satisfactory results, but it does not eradicate the disease from the trees, with the result that a favourable wet spring leads to some losses. In districts where severe "scab" can always be expected in unsprayed trees, the value of a late autumn or early winter spraying has been clearly demonstrated.

Although it is not yet possible for an apricot grower in autumn to say what the weather next spring is going to be like, and thus pick the years in which he should apply two sprayings, it is worth while for the man in a district liable to occasional "scab" outbreaks in spite of spring spraying from time to time, to give his trees an additional spraying with standard Bordeaux mixture late in autumn. How frequently this additional spraying is desirable will depend on the district, and can only be determined by experience over a long term of years. These additional sprayings should assist in the direction of eliminating the disease from his trees.

"Leaf curl of the peach" (*Taphrina deformans*) was reported as being severe in the South-East in 1934; most of the worst cases being associated with too great a delay in the application of sprays. Satisfactory control cannot be assured unless a spray is applied before the buds swell.

"Blight" or "Black spot" (*Bacterium juglandis*) is the commonest disease of walnuts, which are grown in small groups throughout the hills district. Where plantations of susceptible varieties are in the productive stage a useful degree of control can be secured through the application of spray methods worked out to meet conditions as they exist on the Pacific coast of the United States of America.

The method consists in the application of 2-2-50 Bordeaux mixture:—

(1) Just before the female flowers come into full bloom.
(2) When most of the flowers are pollinated, and
(3) Ten days later, if wet weather occurs.

On citrus a few isolated cases of "Brown rot" (*Phytophthora* spp.) have been noted, while two other cases, one occurring in the Murray Valley, have been diagnosed as "Psorosis." The citrus nematode (*Tylenchulus semipenetrans*) has been observed on the roots of trees showing varying degrees of vigour. The rôle of this pest, if any, in bringing about the decline of citrus trees, still requires elucidation.

Anthracnose in vines (*Gloeosporium ampelophagum*) was also reported in 1934 as being worse than usual in the Clare district and along the Murray. Sultana and currant vines were the most generally affected, though several cases of infection of Malaga and Gordo vines were noted. Although the disease made rapid progress during wet weather in late October and early November further development was checked, and little loss of crop resulted. Winter treatments using sulphuric acid/iron sulphate, or sulphuric acid alone were used in a few cases, but principal reliance is placed on spring applications of Bordeaux mixture after signs of the disease have appeared.

Within the last few years a disease of vines, characterised by many of the symptoms described for the European disease, "Court-noué," has attracted attention on the Adelaide Plains. The symptoms which appear on the young growth are very varied, the principal features being a reduction in the length of stems and in the size of leaves, which may be disturbed and malformed. The cause and nature of the disease are at present a subject of inquiry.

Cereals.

The period under review has not been characterised by any widespread outbreak of cereal disease. The 1935 season at one stage offered some prospect of being a "rust" year, but this fortunately did not materialise. The routine examination of specimens from the different wheatgrowing areas of the State revealed the presence of the usual fungi associated with root rotting, particularly *Rhizoctonia solani*, *Ophiobolus graminis*, *Fusarium* spp., and *Helminthosporium* spp. The oat nematode *Heterodera schachtii* is also widely distributed, causing damage to oats and wheat especially.

In barley, "Covered smut" (*Ustilago hordei*) is common, but has not the serious effect on crop yield which "Stripe" (*Helminthosporium gramineum*) has. This latter disease is sometimes severe on "Californian Cape," which, apparently, is very much more susceptible to "Stripe" than the more commonly grown two-rowed varieties.

The area devoted to "Californian Cape" at the present time is small, but should it be considered desirable to grow this variety more extensively control of this disease will be an important factor in its successful development. Fortunately, as locally-conducted experiments have revealed, both this disease and "Covered smut" can be satisfactorily controlled by treating the seed with organic mercurial dusts.

Egg Laying Competition for 1936-37

Brief Review of the Competition by C. F. Anderson (Chief Poultry Adviser) and A. Clifton (Competition Attendant).

March 31st completed the 1936-37 Egg-laying Competition, and scores throughout the whole of the test have been particularly good. This was especially so for the latter part of the season, when the birds laid better than in previous years. This was probably due, to a large extent, to the mild weather experienced during the summer months. Not at any time of the year had we experienced any sign of a heat wave, with the result that the birds were not distressed by weather conditions.

The leading single bird for the whole of the Competition was a White Leghorn owned by Mr. C. A. Maxwell, of Aldgate. This bird laid 266 first-grade eggs, and was rather unfortunate in not scoring a few more, as 10 days prior to the conclusion of the Competition she stopped laying for 4 days, then after laying a soft-shelled egg, stopped for another 2 days before commencing to lay again. This bird has been among the leaders for most of the competition, and for the Winter Test was only 4 eggs behind the winner at that stage. This is another instance of the fact which makes itself apparent every year—that the bird must record a good score during the winter months to have any chance of winning. Competitors, in many instances, should give more thought to this aspect, as in each competition we find a number of birds that are too backward to have any chance of winning On the other hand, to enter a bird too forward is, if anything, worse. Every year there are a number of these birds which lay a few eggs during April, and then go into a moult which extends anywhere from 2 to 6 weeks. By this time they lose too many eggs to have any chance of being more than a help to the team.

The birds which finished first and second in the Winter Test both laid well through the remainder of the year, but in these two cases a number of eggs failed to reach the minimum weight.

An outstanding score was registered by the White Leghorn team entered by Mr. W. M. Field. This team laid 1,321 first-grade eggs, which was the highest score recorded at Parafield since the individual weighing of eggs was adopted, and at the completion of the test every one of these birds was laying strongly, and should make excellent breeding hens.

In the Black Orpington singles the result was a tie for first place between Mr. A. G. Dawes' bird, No. 377, and the Willow Bend Stud Poultry Farm's bird, No. 381, each with a score of 250 first-grade eggs. With the exception of the team of Barnevelders entered by Mr. K. Pennack, which recorded a score of 991 first-grade eggs with only 5 birds, the remaining scores in the heavy breeds were disappointing; almost every team having at least one bird laying underweight eggs.

In the Rhode Island Reds, the most disappointing factor was broodiness and small eggs. Both the first and second birds in the singles of the Rhode Island Red section spoilt any chance of a good score by the number of occasions on which they were broody.

In common with most of the birds in the Competition, the dry mash birds laid better than in previous years, but they were not up to the scores of the wet mash section. Nearly all the birds in this section, with the exception of the leading bird, No. 449, owned by Mr. A. O. Dawkins, eased off in laying towards the last 6 to 8 weeks of the competition. Bird No. 449 laid 240 eggs for the 12 months, but during the months of October, November, and December, laid a number of underweight eggs.

In the section for the Home Project Utility Clubs, the finish was very close. The bird owned by Anthony Rix, after being in the lead for several months, stopped laying two weeks prior to the finish, and was beaten by one egg by Warren Hannaford's bird. In this section, an interesting factor was that a bird entered by David Hart laid exceptionally well in the early part of the year, winning the Winter Test with the fine total of 97 first-grade eggs; but in October she stopped laying suddenly, and did not lay an egg for 5 months, although she appeared to be in the pink of condition.

It would not be out of place here to mention the keen interest shown by owners of birds in this Section. Several of the boys ride their bicycles out to Parafield regularly to inspect their birds.

LEADING SCORES TO 31st MARCH, 1937.—

FIRST GRADE EGGS ONLY.

SECTION I.—WET MASH.

Class 1.—White Leghorns—351 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
C. A. Maxwell	266	315
J. G. Slee	261	346
B. R. Whittington	253	215
F. J. Buck	253	267
Trios—		
W. M. Field	700	142–144
L. A. King	692	217–219
A. Young	677	7–9
Teams—		
W. M. Field	1,321	139–144
A. Young	1,306	7–12
J. C. Normandale	1,219	235–240

Class 2.—Any other Light Breed (Minorcas)—15 birds competing.

Singles—		
R. M. Yelland	206	371
V. F. Gameau	205	366
Langmaid & Bettison	185	361
Trios—		
Langmaid & Bettison	452	358–360
R. M. Yelland	368	370–372
V. F. Gameau	236	364–366
Teams—		
Langmaid & Bettison	736	358–363
V. F. Gameau	484	364–369

Class 3.—Black Orpingtons—15 birds competing.

Singles—		
A. G. Dawes	250	377
Willow Bend Stud Poultry Farm	250	381
Willow Bend Stud Poultry Farm	242	380
Trios—		
Willow Bend Stud Poultry Farm	690	379–381
A. G. Dawes	634	376–378
H. J. Mills	598	385–387
Teams—		
Willow Bend Stud Poultry Farm	1,224	379–384
A. G. Dawes	1,065	373–378
H. J. Mills	1,053	305–390

Class 4.—Any other Heavy Breed—36 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
A. G. Dawes (Rhode Island Red)	223	419
K. Pennack (Barnevelder)	219	438
A. G. Dawes (Rhode Island Red)	217	38
Trios—		
K. Pennack (Barnevelders)	606	436–438
V. F. Gameau (Rhode Island Reds)	435	433–435
A. G. Dawes (Rhode Island Reds)	404	37–39
Teams—		
K. Pennack (Barnevelders), 5 birds only)	991	436–441
V. F. Gameau (Rhode Island Reds)	737	430–435
A. G. Dawes (Rhode Island Reds)	730	37–42

SECTION II.—DRY MASH.

Class 5.—White Leghorns—15 birds competing.

	Eggs Laid.	Birds Nos.
Singles—		
A. O. Dawkins	240	449
A. O. Dawkins	219	452
Trios—		
Willow Bend Stud Poultry Farm	434	454–456
A. O. Dawkins (2 birds only)	412	448–450
Teams—		
A. O. Dawkins (4 birds only)	793	448–453
Willow Bend Stud Poultry Farm	720	454–459

Class 7.—Black Orpingtons—6 birds competing.

Singles—		
Willow Bend Stud Poultry Farm	206	466
Willow Bend Stud Poultry Farm	186	468
Trios—		
Willow Bend Stud Poultry Farm	499	466–468
Teams—		
Willow Bend Stud Poultry Farm (5 birds only)	790	463–468

Class 8.—Rhode Island Reds—6 birds competing

Singles—		
Willow Bend Stud Poultry Farm	137	470
Willow Bend Stud Poultry Farm	134	472
Trios—		
Willow Bend Stud Poultry Farm	376	469–471
Willow Bend Stud Poultry Farm	274	472–474
Teams—		
Willow Bend Stud Poultry Farm	650	469–474

SECTION III.—WET MASH.

Class 9.—Any Breed—27 birds competing.

(Home Project Utility Section.)

Name. School. Breed.		
Warren Hannaford, Paracombe, White Leghorn	240	486
Anthony Rix, Williamstown, White Leghorn	239	478
Stanley Pratt, Abattoirs, White Leghorn	232	477
Keith Oliver, McLaren Vale, Black Orpington	221	498

Parafield Egg-laying Competition, 1937-38.

The Chief Poultry Adviser (Mr. C. F. Anderson) reports that for the Egg Laying Competition conducted at Parafield Poultry Station commencing on the 1st April, 1937, a total entry of 401 birds has been received.

In the 1937-38 Competition two new sections are provided, one for the soaked grain method of feeding, the other for the Sussex breed. During last year considerable attention was given by commercial poultry breeders to the soaked grain method of feeding, and this special section provided in the competition gives breeders an opportunity of publicly testing their stock under this method. In the class for Sussex, the Sussex Club for South Australia approached the Department requesting that a special section be provided for this breed. This was agreed to, and the fine entry of 33 Light Sussex birds has been received. It will be interesting to see how this breed test in competition with some of the more favoured egg laying breeds.

It is interesting to note that, under date 12th March, 1937, the Agent-General and Trade Commissioner for South Australia in London reported as follows:—

"There is no doubt that both egg and table poultry production have made great strides in development and improvement in the United Kingdom. Particularly noticeable this morning on the market is the fact that the Light Sussex breed of poultry has definitely superseded all breeds as the best utility table bird. Its attractiveness in flesh colouring and whiteness of leg, has made it universally popular."

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged, each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate matter concerning the results obtained from the soaked grain method of feeding in various ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

No. 1. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ¾lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

No. 2. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but only ¼lb. meat meal per 100 birds.

No. 3. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

No. 4. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

No. 5. Morning—Soaked wheat and barley, at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird, and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Accurate monthly records of the food used, cost of same, eggs laid and return for same, will be published from time to time in the *Journal*.

Agricultural Bureau of South Australia

Upper South-East Conference

Mr. F. Densley presided over a small attendance of delegates from the Mundalla, Wolseley and Tatiara branches at the Upper South-East Conference which was held at Bordertown on 17th March. Mr. S. Shepherd--Member of the Advisory Board of Agriculture—opened the proceedings, and Mr. D. R. Milne (Tatiara) read a paper "General Field Management".

Mr. W. J. Spafford (Director of Agriculture) replied to questions dealing with milling qualities of wheat, rotation of crops and oat varieties. Mr. R. C. Scott (Chief Agricultural Adviser) addressed Conference on "The Control of Noxious Weeds" and Mr. H. B. Barlow (Chief Dairy Instructor) spoke on "Dairying in the Tatiara District". Mr. C. A. Goddard (Asst. Wool Instructor of the School of Mines) outlined the work of the School in organising Country Extension Classes in Wool Classing.

It was decided "That the 1938 Conference should be held at Mundalla", "That the Department be asked to take steps to have Ghurka removed from the list of wheats not recommended as flour wheats for the Tatiara District".

In recognition of the 20 years' active association with the Agricultural Bureau, and in appreciation of special service to the primary industries of the State, Mr. S. Shepherd, acting on behalf of the Advisory Board, presented Mr. R. Wiese of Mundalla with a Life Membership Certificate of the Agricultural Bureau.

In the evening, officers of the Department, members of district Branches, and their friends, attended the function organized by the Wolseley Branch of the Bureau, at which Mr. Spafford—on behalf of the Royal Agricultural & Horticultural Society —presented Mr. H. C. M. Pilgrim with the shield for the Champion Wheat Crop of the State.

Yorke Peninsula Farmers' Conference

Branches of the Agricultural Bureau on Yorke Peninsula met in Conference at Stansbury on 24th March. Mr. K. H. Giles, Chairman of the Weavers Branch (which sponsored the Conference), presided over an excellent attendance of delegates, and the opening address was given by Hon. A. L. McEwin, M.L.C. (Chairman of the Advisory Board of Agriculture).

The Agenda included a wide range of subjects, covering general agriculture, fat lambs, horticulture, &c., and the following papers:—"Soil Fertility," Mr. S. K. Coleman (Arthurton); "Breeding and Handling of Export Lambs," Mr. E. G. Brown (Kilkerran); "Barley," Mr. S. Chynoweth (Boor's Plains); "Noxious Weeds," Mr. E. H. Giles (Weavers); "Organic Content of Soils," Mr. H. J. Cadd (Arthurton).

Messrs. W. J. Spafford (Director of Agriculture) and R. C. Scott (Chief Agricultural Adviser) replied to questions and took part in the discussions on the papers.

Conference decided "That this Conference enter an emphatic protest against the proposed regulation of the Transport Control Board in restricting the transport of livestock to the Abattoirs;" "That the Advisory Board of Agriculture impress on the Local Government and Highways Department the necessity for the destruction of noxious weeds throughout the State;" "That in view of the likelihood of South Australia having to take steps to import chaff in the near future, the Government take steps to guard against skeleton weed and other bad weeds being introduced;" "That the Advisory Board take steps to improve the quality and standard of cornsacks;" "That the Conference requests the Hon. Minister to alter the hours for the commencement of stubble burning on Yorke Peninsula after 1st March from 2 p.m. to 10 a.m., with no restrictions after 15th April."

Mr. McEwin presented Life Membership Certificates of the Agricultural Bureau to Messrs. C. Boundy, J. J. Honner, and F. J. Nation, of the Brentwood Branch.

Coonawarra's First Conference

Reminiscent of the Bureau Conferences that used to be held in the South-East many years ago, the fixture conducted by the Coonawarra Men's and Women's Branches of the Agricultural Bureau on 14th April must rank as one of the best Conferences that has ever been held in the South-East. There was an attendance of approximately 200 delegates from Mount Gambier, Tantanoola, Penola, Kalangadoo, Robe, Allandale East, Mundalla, Kybybolite, and Millicent, and perhaps the outstanding feature of the Conference was the wonderful exhibits of fruit, cereals, vegetables, and green fodders, and preserved fruit, cooking, and needlework staged by the Women's Branch, and the display of 67 varieties of dahlias shown by Mr. R. J. Skinner, of Coonawarra.

Mr. E. L. Gaffney presided. The Conference was opened by Mr. S. Shepherd, Kybybolite (Member, Advisory Board of Agriculture). Officers of the Department of Agriculture who attended included Messrs. W. J. Spafford (Director of Agriculture), R. C. Scott (Chief Agricultural Adviser), L. J. Cook (Experimentalist), W. C. Johnston (Manager, Kybybolite Experiment Station), A. H. Robin, B.V.Sc. (Government Veterinary Officer), District Instructors, and H. C. Pritchard (General Secretary, Agricultural Bureau).

The following papers wer read and discussed:—"The Bracken Fern Problem in the South-East," Mr. S. Ockley, Penola; "Pasture Plants," Mr. N. J. McBain, Coonawarra; "Fencing," Mr. W. M. Laslett, Allandale East; "Sheep Problems," Mr. E. C. H. Schinckel, Kybybolite; "Cure of Foot-rot," Mr. W. J. Jenkins, Mount Gambier.

Mr. W. H. Downes (District Dairy Adviser) gave a demonstration, "The Points of a Dairy Cow". Many questions relating to stock troubles, pasture improvement, horticultural topics, &c., were answered by Departmental officers, and Conference adopted the following resolutions:—"That a sheep expert to advise owners be appointed to the Department of Agriculture." "That visiting days in the Lower South-East be arranged for late November or early December as consecutively as possible, so that Departmental officers might be able to attend all of them." "That a scheme be inaugurated whereby Departmental officers of the Horticultural Branch exchange with officers in other districts or States." "That the 1938 Conference be held at Robe." "That this Conference urge the appointment by the Council for Scientific and Industrial Research of a veterinary officer to the Kybybolite Experiment Station to make closer observations of stock diseases confronting landholders of the South-East and Border districts of Victoria, the chief duties of such officer to be the making of clinical observations, accurate *post-mortems* and collect material for pathological examinations."

After luncheon, which was provided by the Women's Branch, delegates were shown over Milne's wine cellars, and Mr. Shepherd presented Life Membership Certificates of the Agricultural Bureau to Messrs. W. A. Clifford of Penola and G. Major of Millicent.

Mr. R. C. Scott, at the evening session, gave an address illustrated with lantern slides, on "A Visit to New Zealand."

New English Bulletins.

The library acknowledges the receipt of the following Bulletins issued by the Ministry of Agriculture, England.

"Scientific Principles of Poultry Feeding," No. 7. Price 1s. net.

"Manures and Manuring," No. 36. Price 2s. net.

"Hot Water Treatment of Narcissus Bulbs," No. 105. Price 1s. net.

Advisory Board.

The Advisory Board of Agriculture held a meeting on 31st March, at the Blackwood Experiment Orchard and, under the guidance of Messrs. A. G. Strickland (Chief Horticulturist) and R. Fowler (Manager), inspected the work of that institution.

There were present, Messrs. H. N. Wicks (voted to the chair), F. Coleman, A. J. Cooke, P. J. Baily, J. B. Murdoch, A. J. A. Koch, W. J. Spafford, and the Secretary (H. C. Pritchard).

Apologies were received from Hon. A. L. McEwin, M.L.C., Messrs. A. M. Dawkins, R. H. Martin, Geo. Jeffrey, S. Shepherd and Profs. Perkins and Richardson.

Life Membership.—Approval was given to the appointment of Mr. T. H. Trengove as a Life Member of the Agricultural Bureau for the services he has rendered to the organisation.

New Branches were approved at the following centres.—Kingston (South East), Summerfield, Alawoona (Women's), and Murraminga (Women's).

New Members.—The following were added to the following branches:—Allandale East—C. P. Murphy; Beetaloo Valley Women's—Miss Rice; Blyth—R. Swanton, J. Brennan, C. Eldredge, C. D. McRae, V. F. Schulz, R. H. Neumann, R. B. Griffin, N. A. Foord; Booleroo Centre—J. M. Carey; Balhannah Women's—Miss Della Davies, Mrs. Cora Jenkins; Collie—E. F. Little, R. S. J. Oats, E. W. Starkey; Coonawarra Women's—Miss B. Smith, Miss M. Darwent; Calca—Clarence Roberts; Cambrai—A. H. Rothe; Clare Women's—Mrs. John Gilchrist; Echunga Women's—Mrs. F. Boon, Mrs. Tee; Gladstone—Max Coe; Lone Pine—Bert Garrett, E. Helling; Karte Women's—Miss Jean Holmes, Miss Nancy Holmes, Miss L. Vesey, Miss K. Norman, Miss E. Renowden; Koolunga—E. Hart Bentley, G. Harry Bentley, Edgar T. Bentley; McLaren Flat—K. Broughton, E. Ward; Mount Compass—H. B. Mitchell; Myponga—H. M. S. Shepherd; Mudamuckla—H. R. Miller, B. O'Brien; Narridy Women's—Mrs. D. Button, Miss M. Everett; Port Elliot—F. T. Hughes, F. Singleton; Paskeville—J. N. Abbott; Poochera—T. P. McCormack, Seth Joy, F. N. Joy, F. Danenberg, C. L. Bagley, C. T. Carey, W. A. Gosling, E. G. Voumard, F. R. Joy, J. C. Hunter, D. McBeath; Sheoak Log Women's—Mrs. C. Schuster; Stockport—J. Rohde, A. Rogers; Saddleworth—P. C. Schnaitmann; Williamstown— —White; Warramboo—E. Orforde; Warramboo Women's—Miss Muriel J. Adams, Miss Doris M. Sampson.

Foundation Members of New Branches.—Summerfield—Edmund H. Paech, B. A. Zadow, C. S. E. Paech, C. Bensch, H. B. Miegel, H. A. Kubenk, L. F. Abraham, L. Zadow, C. P. Gierke, E. O. Paech, J. Kelly, C. Zadow; Murraminga Women's—Mrs. W. R. Kies, Mrs. H. W. Tremaine, Mrs. Frank Roberts, Mrs. J. S. Hunt, Mrs. J. Battams, Mrs. Frank Holmes, Mrs. Albt. Murray, Miss Thelma Kies, Miss Thelma Tremaine, Miss Jean McConaghy, Miss Marie Kies, Miss Lila Tremaine; Alawoona Women's—Mrs. H. J. Koch, Mrs. T. B. Flint, Mrs. J. T. Patrick, Mrs. T. M. Jeffrey, Mrs. W. H. Cooper, Mrs. H. G. Pomery, Mrs. H. G. Patterson, Mrs. F. J. Wright, Mrs. H. Hartley, Mrs. M. L. Smith, Mrs. A. Thomson, Miss C. Easters, Mrs. W. Watson; Kingston—G. B. Barnett, F. J. Barnett, F. G. Barnett, A. M. Barnett, K. H. Hannaford, R. G. Hill, W. L. England, W. England, R. England, C. F. Barnett, R. C. Barnett, C. E. Goode, T. C. Goode, T. J. Goode, E. Goode Snr., J. C. Smith, S. R. Smith, H. C. Flint, C. J. D. Smith, J. Legoe, J. M. Lawrie, A. R. Flint, R. E. H. Hope, Ron Pinkerton, E. D. Goode, P. W. Flint, H. G. Banks, C. H. Higgins, W. S. Cooper, M. H. Tapfield, W. F. Tapfield, W. W. Tapfield.

Several items were taken in committee.

Pasture Section of Dairy Farm Competitions, 1936-37.

MURRAY SWAMPS DISTRICT.

[Judged by H. A. FOLLETT, Agricultural Adviser.]

Judging was completed in two inspections, the first in December 1936, on the 10th to 15th, and final inspection on March 3rd, 4th and 5th, 1937.

The following is the scale of points adopted:—

	Points.
Condition, etc.	125
Management	75
Total	200

First and second prizes were awarded to the value of £3 3s. and £2 2s. respectively.

For competition purposes in this section entrants were required to submit all pastures on irrigated lands—a distinct advance on previous years, in which only a selected area was offered for judging purposes.

Following investigations at Woods Point, carried out by officers of the Waite Research Institute, in co-operation with Messrs. H. W. Morphett & Co. some years ago, pasture mixtures used have followed somewhat definite lines. The standard legume used is White Clover (*Trifolium repens*)—with a small amount of Red Clover, sometimes used as an aid during establishment. Perennial Rye Grass (*Lolium perenne*) forms the main sward grass, with proportions of Cocksfoot (*Dactylis glomerata*). In later years the virtues of Prairie Grass (*Bromus unioloides*) forced its recognition and in many of the best pastures its presence is of great value. For dairying purposes the "straight" mixture of White Clover and Perennial Rye has many defects. The introduction of other grasses and the reduction of the rye percentage gives better results.

One field submitted for judging, comprising the alternative pasture recommended, *Phalaris tuberosa*, Kentucky Blue (*Poa pratensis*) and White Clover had been cut for hay, producing a great bulk of first class fodder. Its height when standing was 4ft. 6in. Several fields inspected contained appreciable quantities of Meadow Foxtail (*Alopecurus pratensis*). This grass, whose fault is its extremely slow starting—as it is about the fourth year after sowing that it can be found in quantity—is highly regarded in British practice and its good qualities may yet give it a larger place in our pasture methods.

In these areas under irrigation, the composition of the pastures is essentially of perennial forms of grasses and legumes, and in some instances there is evidence that sufficient care in the preparation for pasture has not been given.

Where the crop—and pasture must be treated as such in many ways—is of a permanent nature, efficient preparation in levelling out finishing furrows and headland pieces is warranted, thus giving better water control for irrigation, better drainage and a more easily controlled pasture. It is in such spots too that weeds often find a starting place.

Reclaimed lands and "flood" areas generally, are notorious for the variety and strength of weed growths, but careful soil preparation and choice of strains and of plants suitable for the conditions can do much to control weeds. Many fields of first class pasture are practically free of useless weeds. The inclusion of annual plants in permanent mixtures allows weed growths an opportunity to start. The annuals die off and leave open spaces, and in this regard Subterranean Clover can be a serious offender, though producing in its season a great bulk of valuable forage.

Every competitor, without exception, uses superphosphate as a general practice. Comparatively heavy dressings are the rule and for judging standards 3cwts. per acre has been adopted. Inferior stands do not appear to be worth that amount, but high quality pastures are responding well.

The more general use of farmyard manure is suggested. Its abuse, by using it in heaps, or without fine breaking and even spreading, can cause ill-effects; but its application to inferior soils, to portions from which the top soil has been taken, to land intended for maize or similar crops, or to lucerne stands will certainly give good results.

Subdivision, as a rule, is good, but the possibilities in this direction are somewhat restricted by situation, by permanent watering or drainage channels, flow of water during irrigation periods, existing bridges over channels, etc.

For the same reasons the control of grazing stock is not as efficient as it might be. The difficulty of the provision of stock water is also a factor. In some cases, however, the milking herd precedes the group of dry cows and young stock, which follow one field behind in the rotational practice.

The ratios of stock units per acre show an average of approximately 1.4 per acre. For Comparative puposes the individual figures offer difficulty owing to the great differences in the influences of adjacent high land areas. In some cases these holdings can be, and are, a distinct asset; in others the help derived is of small account.

The good results following the use of the mower as a pasture implement have been seen, but the topping of rank neglected growths should be given more careful attention. The harmful effects on permanent pasture when cut for hay under summer conditions and when the cutting is too close to the ground and to the base of the sward, has also been evident. The use of pasture harrows is an open question. In some cases their use has given excellent results; in others, the quality of the soil and of the pastures does not permit of their use without the risk of severe pulling of pasture plants.

So far as individual fields of pastures are concerned, some of the highest quality and carrying capacity are to be found on the holdings of competitors low on the list, and it is the proportion of poorer fields, of areas ready for reconditioning, or of young stands which have not given sufficient density to rank as highly as older fields, that have reduced percentages.

The subdivisions in which results have been recorded need little comment as regards Density of Sward, Composition of Pasture, and Freedom from Weeds, but under the term "Management" the following points have been taken into consideration.

Ratio of stock to acreage. Subdivision: Evenness and size of field in relation to milking herd: Rotational grazing: Control of grazing animals: Fertilizers used: Amount: Time of application and whether in one or more doses. Use made of farmyard manure: Whether pastures are kept under control: Evenness of grazing: Use of Mower: Whether pastures are cut without damaging the pasture itself: Water control and drainage.

In general, the entries submitted have been of high standard as may be seen from the small variation in results.

The following is a list of competitors with total points as awarded:—

Averages have been calculated taking into account individual fields and acreage, as well as the average from the dual inspection.

Name and Address.	Density.	Composition.	Freedom from weeds.	Management.	Total.
	60	40	25	75	200
W. T. Gale, Jervois	55	35	22½	66	178½
J. W. Baldock, Long Flat	53½	34	22½	66½	176½
E. Wise & Sons, Jervois	54	34	23½	63	174½
V. & G. Goyder, Long Flat	47	33½	21½	69	171
V. E. Froman, Jervois	51	31½	21	61½	165
Hutchinson & Eagle, Jervois	52½	31	23	55	161½
H. H. Jericho, Jervois	48	31	20½	60	159½

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of March, 1937; also the average precipitation for March, and the average annual rainfall.

Station.	For March, 1937.	Av'ge. for March.	To end March, 1937.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	—	0·45	0·37	4·60
Marree	—	0·51	2·41	5·80
Farina	—	0·65	3·15	6·37
Copley	0·66	0·68	3·03	7·76
Beltana	0·89	0·69	3·61	8·39
Blinman	—	0·76	5·12	11·71
Hookina	—	0·65	5·23	10·94
Hawker	0·35	0·60	7·09	12 09
Wilson	0·04	0·58	5·75	11·65
Gordon	0·28	0·71	5·60	10·33
Quorn	0·08	0·59	7·12	13·10
Port Augusta	0·74	0·71	4·12	9·40
Bruce	0·30	0·67	6·48	9·74
Hammond	0 27	0·67	4·67	11·05
Wilmington	0·28	0·78	5·22	17·18
Willowie	—	0·73	4·22	12·10
Melrose	0·20	1·07	5·41	22·80
Booleroo Centre	0·18	0·66	4·36	15·14
Port Germein	0·15	0·75	3·22	12·51
Wirrabara	1·51	0·94	5·87	19·22
Appila	0·25	0·86	4·44	14·59
Cradock	0·22	0·57	5·46	10·67
Carrieton	0·07	0·57	4·18	12·11
Johnburg	0·28	0·55	6·38	10·49
Eurelia	0·12	0·60	4·71	12·66
Orroroo	0·36	0·64	5·07	13·12
Nackara	0·16	0·83	6·47	11·09
Black Rock	0·07	0·69	3·58	12·26
Oodlawirra	0·05	0·72	5·56	11·34
Peterborough	0·11	0·72	3·47	13·14
Yongala	0·09	0·67	4·11	14·37
North East.				
Yunta	0·11	0·57	7·50	8·44
Waukaringa	0·06	0·58	6·17	7·82
Mannahill	0·37	0·52	6·22	8·08
Cockburn	—	0·48	4·04	7·81
Broken Hill	—	0·61	3·79	9·40
Lower North.				
Port Pirie	0·02	0·82	3·80	13·18
Port Broughton	0·17	0·64	3·51	13·87
Bute	0·90	0·67	3·40	15·42
Laura	0·66	0·85	3·99	17·93
Caltowie	0·36	0·83	3·94	16·69
Jamestown	0·61	0·85	4·25	17·68
Gladstone	0·64	0·73	3·81	16·31
Crystal Brook	0·72	0·71	5·01	15·79
Georgetown	0·83	0·81	3·81	18·24
Narridy	1·12	0·79	4·68	15·74
Redhill	0·97	0·72	4·34	16·55
Spalding	0·29	0·79	3·46	18·68
Gulnare	0·25	0·73	3·20	18·51
Yacka	0·21	0·64	4·02	15·38
Koolunga	0·61	0·65	3·33	15·29
Snowtown	0·35	0·72	4·13	15·69
Lower North—*continued.*				
Brinkworth	0·55	0·75	3·40	15·72
Blyth	0·53	0·74	2·61	16·73
Clare	0·59	1·03	4·39	24·43
Mintaro	0·71	0·92	3·31	23·30
Watervale	0·72	1·12	4·30	26·69
Auburn	0·39	1·10	3·32	23·92
Hoyleton	0·13	0·79	2·89	17·25
Balaklava	0·61	0·72	4·38	15·41
Port Wakefield	0·18	0·90	3·30	12·93
Terowie	0·05	0·62	4·34	13·27
Whyte-Yarcowie	0·10	0·78	4·61	13·54
Hallett	0·28	0·68	5·15	16·39
Mount Bryan	0·26	0·72	4·28	16·76
Kooringa	0·40	0·87	3·92	17·78
Farrell's Flat	1·28	0·74	4·03	18·52
West of Murray Range.				
Manoora	0·37	0·83	2·61	18·91
Saddleworth	0·69	0·96	4·15	19·56
Marrabel	0·54	0·87	3·16	19·91
Riverton	0·62	1·02	3·32	20·79
Tarlee	0·44	0·80	2·62	18·06
Stockport	0·50	0·80	2·60	17·02
Hamley Bridge	0·36	0·78	2·78	16·52
Kapunda	1·00	0·99	3·04	19·74
Freeling	0·03	0·88	2·02	17·79
Greenock	0·06	0·96	2·85	21·47
Truro	0·19	0·94	2·80	19·75
Stockwell	0·32	0·88	2·57	20·02
Nuriootpa	0·20	0·94	3·47	20·74
Angaston	0·46	0·98	4·49	22·33
Tanunda	0·38	1·03	3·54	21·97
Lyndoch	0·36	0·85	3·38	23·28
Williamstown	0·60	0·97	5·07	27·54
Adelaide Plains.				
Owen	0·55	0·62	3·06	14·78
Mallala	0·35	0·76	2·53	16·43
Roseworthy	0·15	0·82	2·14	17·43
Gawler	0·23	0·90	3·27	18·85
Two Wells	0·09	0 77	2·06	15·80
Virginia	0·25	0·86	2·96	17·22
Smithfield	0·36	0·89	5·15	17·68
Salisbury	0·32	0 95	4·27	18·55
Adelaide	1·05	1·02	4·26	21·17
Glen Osmond	0·92	1·03	4·51	25·97
Magill	1·35	1·15	5·18	25·36
Mount Lofty Ranges.				
Teatree Gully	1·26	1·23	5·67	27·03
Stirling West	2·59	1·82	8·20	47·01
Uraidla	1·66	1·80	7·26	43·83
Clarendon	0·98	1·50	4·10	32·81
Happy Val'y Res.	1·20	—	4·32	—
Morphett Vale	0·55	1·12	3·25	22·62
Noarlunga	0·53	1·03	2·73	20·35
Willunga	0·80	1·22	3·06	25·96
Aldinga	0·61	1·05	3·66	20·21

RAINFALL—*continued.*

Station.	For March, 1937.	Av'ge. for March.	To end March, 1937.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	0·70	1·02	3·72	29·72
Inman Valley	0·62	—	3·17	—
Yankalilla	0·49	1·16	2·73	22·78
Mount Compass	0·40	1·94	3·36	36·25
Mount Pleasant	0·52	1·08	4·70	27·08
Birdwood	0·67	1·06	4·56	29·02
Gumeracha	0·98	1·26	5·99	33·28
Millbrook Res.	1·33	1·01	7·08	34·50
Lobethal	1·26	1·25	6·70	35·94
Woodside	1·00	1·16	4·96	32·16
Hahndorf	1·16	1·34	6·23	34·82
Nairne	0·77	1·26	4·50	28·14
Mount Barker	1·11	1·34	5·02	31·24
Echunga	1·22	1·43	5·15	33·30
Macclesfield	0·83	1·38	3·62	30·37
Meadows	0·85	1·64	4·19	36·02
Strathalbyn	0·39	1·02	2·47	19·34
MURRAY FLATS AND VALLEY.				
Meningie	0·75	0·90	2·65	18·29
Milang	0·31	0·80	2·20	14·85
Langhorne's Ck	0·28	0·91	2·34	14·93
Wellington	0·46	0·88	2·77	14·66
Tailem Bend	0·26	0·99	2·73	15·07
Murray Bridge	0·14	0·88	1·68	13·49
Callington	0·22	0·81	2·43	15·14
Mannum	0·15	0·82	3·10	11·49
Palmer	0·21	0·83	3·73	15·63
Sedan	0·27	0·68	3·85	12·01
Swan Reach	0·35	0·73	2·60	10·62
Blanchetown	0·20	0·78	2·22	10·95
Eudunda	0·26	0·81	5·22	17·13
Point Pass	0·53	0·64	3·45	16·66
Sutherlands	0·10	0·66	4·33	10·71
Morgan	0·12	0·54	3·32	9·10
Waikerie	0·08	0·54	2·42	9·59
Overland Corner	0·19	0·79	1·97	10·18
Loxton	0·32	0·79	1·76	11·34
Berri	0·15	0·42	1·98	10·03
Renmark	0·21	0·66	2·75	10·33
WEST OF SPENCER'S GULF.				
Eucla	0·75	0·91	1·40	10·08
Nullarbor	0·04	0·76	0·57	8·87
Fowler's Bay	0·04	0·54	0·34	11·93
Penong	0·20	0·56	0·59	12·28
Koonibba	0·10	0·62	1·35	12·18
Denial Bay	0·04	0·60	0·67	11·33
Ceduna	—	0·54	0·61	10·32
Smoky Bay	—	0·43	1·20	10·50
Wirrulla	0·33	0·56	4·78	10·87
Streaky Bay	0·44	0·57	1·19	14·91
Chandada	0·21	0·64	1·26	12·66
Minnipa	0·19	0·58	2·01	13·97
Kyancutta	0·01	0·75	0·96	13·45
Talia	1·39	0·48	2·30	14·76
Port Elliston	0·28	0·55	2·41	16·53
Lock	0·33	0·56	2·49	16·44
Mount Hope	0·74	—	4·78	—
Yeelanna	0·18	0·60	3·04	16·11
Cummins	0·15	0·50	3·45	17·70
Port Lincoln	0·31	0·82	1·84	19·35
Tumby	0·03	0·73	1·60	14·29
Ungarra	0·11	0·75	3·21	16·94
Port Neil	0·07	0·61	1·50	13·16
WEST OF SPENCERS GULF—*continued.*				
Arno Bay	0·01	0·73	2·04	12·82
Rudall	0·08	0·58	2·42	13·23
Cleve	0·09	0·79	1·37	14·96
Cowell	0·02	0·79	1·37	11·06
Miltalie	—	0·97	4·20	13·75
Mangalo	0·23	0·74	1·57	13·86
Darke's Peak	0·63	0·53	3·59	15·24
Kimba	0·72	0·53	2·16	11·84
YORKE PENINSULA.				
Wallaroo	0·65	0·82	2·82	13·97
Kadina	0·25	0·88	3·21	15·59
Moonta	0·21	0·84	3·55	15·04
Paskeville	0·26	0·75	2·48	15·44
Maitland	0·35	0·86	2·99	19·86
Ardrossan	0·14	0·73	2·53	13·96
Port Victoria	0·64	0·66	2·66	15·39
Curramulka	0·20	0·86	1·94	17·81
Minlaton	0·36	0·82	2·08	17·72
Port Vincent	0·12	0·63	1·54	14·37
Brentwood	0·16	0·72	2·53	15·61
Stansbury	0·10	0·77	1·71	16·81
Warooka	0·14	0·66	2·27	17·44
Yorketown	0·16	0·74	1·24	16·88
Edithburgh	0·22	0·80	1·59	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	0·57	0·89	2·32	21·87
Kingscote	0·17	0·80	1·39	19·27
Penneshaw	0·30	0·73	1·71	19·18
Victor Harbour	0·26	1·09	2·95	21·43
Port Elliot	0·21	0·99	3·10	19·94
Goolwa	0·32	0·96	2·91	17·84
Maggea	0·22	0·48	1·95	10·02
Copeville	0·22	0·69	2·28	11·51
Claypans	0·14	0·52	1·80	10·53
Meribah	0·40	0·55	1·76	11·11
Alawoona	0·43	0·40	2·34	10·26
Caliph	0·46	0·58	2·21	10·44
Mindarie	0·34	0·51	2·16	12·13
Sandalwood	0·24	0·64	2·30	13·60
Karoonda	0·25	0·67	2·34	14·18
Pinnaroo	0·83	0·87	2·35	14·19
Parilla	0·74	0·64	2·70	13·64
Lameroo	0·63	0·79	2·47	15·79
Parrakie	0·78	0·79	2·43	14·61
Geranium	0·94	0·87	3·02	16·39
Peake	0·94	0·99	3·88	15·95
Cooke's Plains	0·85	0·94	3·15	15·29
Coomandook	0·51	0·94	2·57	17·03
Coonalpyn	0·72	0·90	2·78	17·65
Tintinara	1·08	0·91	3·58	18·72
Keith	0·80	0·79	3·29	17·96
Bordertown	1·31	0·83	4·65	19·14
Wolseley	1·10	0·77	3·70	18·47
Frances	1·19	0·92	4·12	20·12
Naracoorte	0·70	1·02	3·68	22·65
Penola	1·01	1·23	4·27	25·94
Lucindale	0·73	1·01	4·63	23·47
Kingston	0·60	0·99	2·93	24·24
Robe	0·77	1·02	2·85	24·65
Beachport	1·12	1·16	4·00	27·07
Millicent	1·41	1·32	5·25	29·87
Kalangadoo	1·32	1·20	5·08	32·05
Mount Gambier	0·88	1·42	3·62	30·34

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East—19th March, annual meeting; Appila Yarrowie—12th March, address, J. H. W. Mules; Arthurton — 25th February, harvest reports; Balaklava—22nd March, "Soil Fertility," O. Bowden; Balumbah—3rd March, paper from *Journal;* Baroota—8th March, discussion; Beetaloo Valley—22nd February, harvest reports; Belvidere—12th March, annual social; Blackheath—25th February, paper; Black Springs—23rd February, harvest reports; Blewitt Springs—23rd February, field day, 23rd March, address, F. B. Wilson; Blyth—26th February, "Farm Sheep," H. W. Eime; Booleroo Centre—26th February, harvest reports, 12th March, special meeting; Boor's Plains—4th March, "Farm Economy," R. L. Ward, Junior; Brinkley—24th February, harvest reports, 17th March, discussion, "Noxious Weeds"; Brownlow—9th March, annual meeting; Cambrai—3rd March, address, H. J. Apps; Coomandook—23rd March, discussion; Goode—24th February, harvest reports; Hartley—24th February, "Woolclassing," C. A. Goddard; Hilltown—2nd March, harvest reports; Ironbank—24th February, paper from "Fruit World"; Karte—24th February, address, A. Bierworth; Kilkerran—22nd February, harvest reports; Kingston—27th February, inaugural meeting, 20th March, discussion; Koonunga—17th February, field day; Koppio—24th February, "Care of Merino Flock," J. Newell; Kyancutta—2nd March, crop competition report; Lameroo—26th February, harvest reports; Lobethal—18th March, "Bee-keeping," E. Schoell; Marama—25th February, "Seed Wheat Selection," E. C. Tilly; McLaren Flat—25th February, demonstration of lathe work, H. C. Platts, 25th March, address, F. B. Wilson; Miltalie—22nd February, harvest reports; Monarto South—20th February, "Cultivation," R. L. Griffiths, 20th March, "Sheep Problems," H. B. White; Mount Pleasant—3rd March, "Subterranean Clover," W. K. Johns; Mudamuckla—19th March, discussion; Murraminga—6th March, question box; Murraytown—13th March, harvest reports; Myponga—11th February, "Care of Milk," H. B. Barlow; Nantawarra—26th February, "The In-lamb Ewe," W. A. Bryant; Narridy—6th March, questions; Nelshaby—25th February, "Farm Management," H. Franks; Parrakie—19th March, question box; Paskeville—23rd February, harvest reports, 23rd March, discussion; Penola—12th March, discussion; Penwortham—12th February, "Modern Drying Rack," H. A. Follett; Petina—6th March, address, R. G. Roberts; Poochera—6th March, "Grassland versus Fallow," G. S. Joy; Port Elliot—20th February, discussion; Redhill, 15th March, Conference report; Riverton—10th March, address, O. Bowden; Rosedale—22nd February, annual meeting; Snowtown—10th March, address, W. J. Spafford; South Kilkerran—2nd March, "Fallow," F. C. Gross; Springton—10th March, "Woolclassing," C. A. Goddard; Stockport—5th March, discussion, 19th March, annual social; Sutherlands—4th March, "Fencing," L. G. Schiller; Tantanoola—6th March, debate, "Road versus Rail Transport"; Tarlee—16th March, "Lessons from 1936"; Truro—15th March, annual social; Upper Wakefield—18th February, papers, C. Roberts and J. Ryan; Wandearah — 23rd February, annual meeting; Warramboo—26th February, annual meeting, 4th March, harvest reports; Whitwarta—8th February, harvest reports; Williamstown—24th March, "Pastures," R. Hill, 26th February, "Strawberry Culture," W. R. Parmenter; Yadnarie—23rd February, dance, 23rd March, discussion.

Farm Management.

[A. Franks, Nelshaby.]

In this district wheat has always been the main source of revenue, and I am of the opinion that it always will be. Wheat should only be sown on land that has been well fallowed and given the necessary cultivations to check weed growth and form a good seed-bed. There are different ideas as to the method of fallowing, but my idea is to get it done as early as possible and only work deeply enough to cut the weeds. Early in the season if the land is fairly clean this first working can be done with the cultivator. It does not then necessitate so much working down as land broken up roughly. Of course, this applies only to land that is not liable to drift. On sand, one must plough in as much rubbish as possible to try and keep the soil in one's own paddock. The land should then be kept free from weeds, and if possible only do this when the land is moist. Harrows should play a very important part in the preparation of fallow; they do an immense amount of good after a rain, and it is a very economical working.

The Benefits of the Horse Team.

If one has enough work for one team only, I favour the horses, but where an extra team is necessary it may be more economical to employ one good team and a tractor. Fodder for the horses is usually grown on the place, and in good seasons a good supply can be cut from a relatively small area. A very good idea is to cut the straw from a heavy crop. This is a good standby, and when mixed with wheaten hay it makes quite a good feed for the horses when they are not working. The saving of cocky chaff is also a great help in making cheap feed. This also can be mixed with hay chaff, or one could grow a few oats and add them to it. Another good plan is to sow a paddock of early greenfeed for the team. In this way one obtains more feed from a small area, and it is much better than leaving a lot of land unfallowed. By the above methods horses can be kept at a reasonable cost.

The Maintenance of the Farming Plant.

Every farm should have a fairly well equipped blacksmith shop. Most of the repairs to machinery and harness can be done on the place in spare time, thus eliminating large blacksmiths' and saddlers' bills.

Sidelines.

No farm seems complete without a small flock of sheep. Sheep provide very cheap meat and are a great help on the fallows. I favour the keeping of ewes and the rearing of fat lambs. In this district we are fortunate in having a very good local market; and better still if one has enough they can be sent to Adelaide and usually a satisfactory price is obtained.

This Subterranean Clover stack at W. H. Johns's property, Mount Pleasant, measures 40yds. x 7yds. x 25ft. to top of roof. This and the accompanying picture were exhibited by Mr. W. K. Johns in connection with his paper dealing with Subterranean Clover read at the March meeting of the Mount Pleasant Branch.

Every farm should keep enough cows to provide the household with the necessary requirements, but in a district such as ours, with a low rainfall, dairying on a large scale is not very profitable, unless one can sell the milk. There is not sufficient outside feed for cows, and if they have to be stall-fed for a good portion of the year the cost would be high.

Where a few cows are kept, the sowing of lucerne in small paddocks or on sandhills that are liable to drift is a big help, but I do not favour the sowing of large areas of our best land, as it might take a long while to get it back to wheat growing order again.

The In-Lamb Ewe.

[W. A. Bryant, Nantawarra.]

In order to obtain a successful lambing, both as regards percentage and well-developed lambs, it is essential that great care be taken of the pregnant ewe. The ewes must be in a fit condition during pregnancy so that when the lamb is sucking it may be able to obtain good nourishing milk.

Feeding Ewes.

During pregnancy, that period of the year when it is dry weather, the ewe is feeding chiefly on dry grass and later is fed on stubble land. This feeding may not be sufficient to fulfil the requirements of the ewe so that she may grow a good fleece and develop the foetus as it should. In this case it may be necessary to hand-feed the ewe. On no condition allow the ewe to become poor in condition, as this would do the ewe a lot of harm, which cannot be rectified later by forced feeding. Start feeding early if there is not ample feed in the paddock, and gradually increase as required when the natural grasses, &c., decrease. Barley and oats in the grain are good feed for sheep, and chaff is also very good. These may be fed in automatic feeders or in rough troughing made from hessian or old bags.

Lambing.

At the lambing period the greatest care must be taken of the ewes. It is necessary to inspect them twice a day—early in the morning and again at sundown. It will then be possible to render assistance when necessary, either to ewe or lamb. When inspecting the sheep do not take a dog amongst them except if absolutely necessary, and then only use one which is a slow worker and one which will obey his master. Running sheep and jostling and bumping them together does harm. Do not yard sheep at night, but in preference have them within a short distance of home so that an eye can be kept on them easily.

During lambing, with Merino ewes mated to Merino rams, little difficulty should be experienced. However, when British breeds of rams have been mated with Merino ewes the offspring has a large head and broad shoulders, and ewes have trouble in delivering and may need assistance.

Presentation.—The normal presentation is the head with a fore-leg at each side of it to come first. If trouble is experienced and presentation is not normal, the hands should be smeared with olive oil and the lamb pushed back into the womb again and turned the correct way. In very bad cases the lamb may have to be cut and taken away in pieces. If this is done the ewe should be flushed out with a weak disinfectant.

Assistance.—To give assistance hold the head and fore-legs and pull gently in unison with the normal muscle contraction of the ewe. Do not use force, as damage may be done to the ewe and lamb. It may be necessary to tie the ewe's legs so that she will not run away and leave the newly born lamb. Then place the lamb in a convenient place for the ewe to clean, and after this has been done the ewe may be freed.

Some Problems of the Sheep Farmer.

[H. B. White, Monarto South.]

In recent years two problems of considerable importance have confronted the sheep man, namely, the increasing prevalence of the blowfly strike, and the presence of worms in districts not formerly infected.

Blowfly Strike.

This trouble is now costing Australia several millions of pounds per annum and is therefore of national importance. Sheep men who were in the business 30 years ago claim that at that time they had very little trouble with blowfly strike. Why then is it so troublesome now? There are several reasons for this. Firstly, our studmasters, in attempting to increase the yield of wool per sheep, have at the same time increased the number of folds of loose skin about the body, particularly around the tail. These tail wrinkles are a great harbour for the maggot, for once it is established in the wool in the crevice of a wrinkle, it is impossible for the sheep to get them out by biting. Secondly, by cleaning up millions of acres of scrub country we have undoubtedly reduced the numbers of birds that live on insects such as blowflies, and also those that live on decaying flesh, which is the natural breeding place for the blowfly. Thus the blowfly has been given a chance to increase in countless numbers. In other words we have upset the balance of Nature. To rectify this position perhaps very little can be done, but our studmasters could undoubtedly help to combat the blowfly pest by aiming to breed out tail **wrinkles.**

Careful and methodical attention to the flock will also minimise blowfly strike. Crutching is the best preventive, and this should be done twice a year—with ewes—once after shearing and before lambing, and once after the completion of lambing and before the commencement of shearing. To be effective, crutching must be done well; the wool should be cleaned out from inside the legs and a strip of wool about an inch wide should be taken from the outside of the leg up over the tail. A more effective job of crutching is made with the machine shears than is the case if done by hand, and if the blowfly trouble continues to increase, the mechanical crutching plant will have to be part of the equipment of most farmers in the future. Various dressings are used for healing sheep that have been struck, but without exception those on the market are too expensive for general use. When sheep are only slightly struck, the maggots can be killed with bluestone solution, kerosene, and refuse oil. These, however, have an irritating effect on the wound, and if used on a sheep that is badly struck, may cause its death. In such severe cases a proper blowfly oil should be used, as these not only kill the maggots but also sooth and heal the wound.

Of equal importance with the prevalence of blowfly strike is the steady spread

Subterranean Clover on the property of Mr. W. H. Johns, Mount Pleasant. This 20-acre paddock was first top-dressed 6 years ago, using 1cwt. of 45 per cent. super, and has received similar treatment each year since. Originally there was no trace of Subterranean Clover, and no seed has been sown. This 4-year cut is estimated to yield 2½ tons per acre.

of worms that infest the stomachs of sheep. This rapid spread of worms has perhaps been helped in recent years by farmers purchasing ewes from infested districts for fat lamb breeding. Symptoms of worm infection are:—A fluffy lump under the jaw, falling away in condition when on good feed, a general anaemic appearance of the skin, and scouring when on hard feed. Lambs seem to be the most susceptible to worm infestation—once they have got their two big teeth the worm trouble seems to disappear. The best treatment is to drench with Black-leaf 40. The first drenching should be given when the lambs are a month old, repeated after 10 days, and after that once a month until they reach the 2-tooth stage. Providing the sheep with mineral licks is also a definite help in combating worm infestation, and sown pastures such as green oats or barley are of assistance.

Should Sheep be Continued on Farms now that Wheat Prices have Recovered?

[H. W. Eime, Blyth.]

This question at first sight may not appear to be very important, but it is a question that should receive very serious thought, as reverting to wheat only may have serious consequences, that is, low prices for wheat.

The fact that the question was asked is proof that it is already in the minds of farmers to again place all their eggs in one basket. To give a straight-out answer to the question, I say, "Yes, sheep should be continued on the farms, more especially in this district." Although it is very tempting to the farmer to plant as much wheat as possible when the price is where it is to-day, it will be to his advantage to look to the future, and not to wear out his land by sowing wheat every other year, as the land will not stand it, and will, if not spelled, probably take a spell when the farmer is not prepared for it.

There are quite a lot of advantages to be gained by the farmer continuing with sheep, but the main one is to keep the land in good heart for the future. By growing wheat and wheat again, land eventually becomes wheat sick, and weeds grow which stock will not touch.

If the three-year system is adopted, and by the running of sheep on the farms, there would be less of those useless weeds that are spreading badly in this district. Although by keeping sheep the farmer would have say 100 or 200 acres of crop less, he would probably get a bigger yield per acre, as the land would get a spell. The fallowing could also be done earlier, and would receive more thorough working, and the average yield would be higher. With the right flock of sheep, well looked after, there would be very little difference in the returns at the end of the year. During the last 5 years wheat growing has proved very unprofitable, but during that period we have learned something which should not be forgotten, and that is that sidelines—of which sheep is the main one—are a boon to the farmer. Lambs, for instance, are bringing wonderful prices, and also wool. Of course, this year has been exceptional for sheep and fat lambs, but farmers must be careful not to overstock, as it is the fat lamb that makes the profit.

The time has arrived for the farmer to pay more attention to the growing of fodder crops that will benefit the land for wheat growing, besides fattening the stock. In this district, say with a 15in. rainfall, it would be folly to try to grow any fodder crops other than barley, oats or rye. Any of these sown in early autumn on stubble ground, with a dressing of superphosphate, will generally supply early greenfeed, some of which may be fenced off later in the season and reaped for grain.

There is no doubt that the sheep-carrying capacity of our farms could be very much increased if more of this were done. Even where a farmer did not sow any seed, if he were to apply a dressing of super, he would double the quantity of feed such as clover, &c.

Wheat and wool are our main products. Let us combine the two. Sheep consolidate the soil for the roots of the wheat plant, clean the fallows, probably save a cultivation, and can prove to be a very interesting and profitable business.

Fencing.

[L. G. SCHILLER, Sutherlands.]

Erecting new fences and replacing or repairing old lines of fencing are problems that have to be faced by all landholders every year. In this district, mallee is almost the only timber procurable for fencing purposes. All posts should be cut before the sap rises, then left to dry before putting into the ground.

In days when posts were plentiful they were usually placed about 10ft. apart. However, the increasing scarcity of timber has compelled landholders to exercise greater care in the use of posts, and the distance between them is now much greater. Efficiency must be taken into consideration as well as cost, and it is a very bad practice to endeavour to save a little on the original cost by reducing the number of posts if the result is a fence that will not give the desired protection.

In erecting fences, however, there are several things worth remembering; the post holes should not be made too big, as this involves unnecessary labour, both in digging, filling and ramming; besides, the post will not have such a firm grip in the ground. A good method is to place all the posts for one strain with just enough earth to make them stand, and as you go back to fill in the rest of the soil and ram it, you can place those right that may not be quite in line. The posts should be placed about 20ft. apart, with a wooden dropper between each post.

When using iron posts it is not necessary to have the wooden posts so close. In boring, use a 9/16th inch or a ⅝in. bit, as they clean better than ½in. bits, particularly if the posts are only partly dried. The holes for plain wire should be bored direct along the line of the fence and level with the surface of the ground, because one or two holes bored out of line greatly increases the labour of pulling in the wires. Experience soon teaches the value of attention in this matter, particularly if working single handed. A 5-wire fence 3ft. 4in. high, is high enough to keep most stock in bounds, but an extra 2in. is desirable for boundary fences. The wires should be placed as follows, measured from the ground:—8in., 14in., 20in., 28in., and finally the barbed wire, which should be right on top of the posts. Some may raise the objection that a wire 8in. from the ground will allow sheep to crawl underneath. However, a wire placed 5 or 6in. from the ground will, in the course of a few years, be almost covered with sand and rubbish.

For division fences, 4 plain wires and a barbed wire on top is sufficient, but in boundary fences it is advisable to have 2 barbed wires. In the first place, it gives greater protection, and secondly, straying cattle and horses will not damage the fence so easily.

Erecting Fences in Watercourses.—As very few fences will stand the strength of floodwaters, it is advisable to have a strainer each side of the watercourse, so that the rest of the fence does not get damaged. A good method is to have the fence erected in such a way that the wires will give before the posts. This can be done by placing the wires beside the posts and fastening them by taking short pieces of wire through the holes in the posts and bending them around it. If erected in this way, the wire will pull out, and thus save the posts from being washed out of the ground.

Activities of Women's Branches

AUBURN.

The February meeting was held at the residence of the Secretary, Miss L. Dennison. Mrs. Tansell presided over an attendance of 18 members and Mrs. Burfield read a paper "Apples and their Uses".

Uses of Hessian.

This was the subject of a paper read by Mrs. W. Jones at the meeting on 19th March. For many purposes she said, dyeing the bag was necessary. For shades of brown, Condy's crystals in varying amounts could be used. Curtains could be made by dyeing the material the required shade and then trimming them with cretonne or other suitable material. Sofa covers treated in a similar manner were also very serviceable. Men's and boys' overalls made from dyed bags and pressed gave excellent protection to the clothes when engaged in rough work. A sugar bag with a few inches each end fringed and a spray cut from cretonne on one side made a useful cushion cover for sofa, or verandah. The bag was also a good foundation for hooked rugs, aprons for milking or washing day, the latter being more useful if a large pocket was attached to hold pegs when hanging out clothes. A good peg bag could also be made by using a wooden coat hanger for the top. A covering for a wire matress could be made by opening and joining bags to the required size, neatly hemmed around the outside and tied with tapes, and so protect the matress from rust and wear. Bed spreads could be made for beds used on the verandah, they were very neat in appearance when dyed and trimmed, saved the washing of white quilts.

BALHANNAH.

Mrs. Middleton occupied the chair at the meeting held on 17th March, which was devoted to a discussion on matters relating to the local show. (Secretary, Mrs. P. Grow.)

BALUMBAH.

Ten members were present at the meeting held on 10th February, at Mrs Wohling's residence. Miss H. Jericho contributed a paper and gave a practical demonstration of "Pen Painting". On 3rd March, members met at Mrs. Riches's homestead, the meeting taking the form of a Literary Afternoon. (Secretary, Miss H. Jericho.)

BEETALOO VALLEY.

The February meeting was held on the 22nd of the month, 10 members being present. Mrs. Giddings gave a paper on "Bread Making". (Secretary, Mrs. L. Pearce).

BOOR'S PLAINS.

Pickles and Sauces.

Members met at the residence of Mrs. M. Ward for the March meeting, when Mrs. A. Adams read a paper "Pickles and Sauces". Included among the recipes were the following:—

Mustard Sauce: Boil ½gall. vinegar and 4 large onions together for ¼ hour, remove onions and add 1 cup flour, 6 tbspns. mustard, 1 tbspn turmeric, 4 cups sugar mixed with cold vinegar and boil until thick.

Green Cabbage Pickle: Cut up finely 1 large cabbage and 4 large onions, sprinkle with salt and allow to stand for 24 hours. Drain well through a colander and boil slowly in 1 quart of vinegar for 20 minutes. Mix 1 cup of plain flour, 2 cups sugar, 2 tspns currie powder and 2 tbspns. mustard in 1 pint vinegar. Pour over cabbage and boil all together 5 minutes longer. Bottle hot and tie down when cold. (Secretary, Miss L. Stanway.)

CLARE.

The Assistant Secretary of the Agricultural Bureau, Mr. F. C. Richards attended and addressed the meeting held on 6th March, 31 members and 5 visitors were present. (Secretary, Mrs. A. Pollack.)

COONAWARRA.

Thirty-eight members were present at the meeting held on 17th February, Mrs. J. Hales gave a demonstration, "Paper Flower Making". The Antique Show organised by by the Branch was a great success. On 16th February, members of the Branch entertained a large number of visitors who had returned to Penola for the Centenary Celebrations. A special meeting was held on 2nd March to make arrangements for the South East Bureau Conference. On 17th March, Mrs. Rymill of Penolo Station gave an account of a recent trip abroad. 34 members were present. A further meeting was held on the 23rd to finalise Conference arrangements. (Secretary, Miss O. Lear.)

ECHUNGA.

The meeting of 3rd March was attended by 14 members and visitors, and was held at the residence of Mrs. Edmonds, who gave a demonstration "Bottling Fruit." (Secretary, Mrs. F. Dennis.)

GEORGETOWN.

The meeting of 9th February was devoted to drawing up a programme of meetings for the ensuing year, and to making arrangements for the visits of the Narridy and Koolunga Branches. (Secretary, Miss J. Crawford.)

GLADSTONE.

Thirty-five members and 10 visitors were present at the meeting held on 15th February, when an excellent paper, "Salads" was read by Mrs. Sambell. The Annual Crafts Show was held during March, 74 entries being received. Worthy of special mention were the exhibits in the collection of articles made in the home. (Secretary, Mrs. L. Sargent.)

HOPE FOREST.

In appreciation of the services rendered by her to the Bureau, a farewell social was tendered to Mrs. Jackson, who is leaving the district. On 4th March a meeting was held to make arrangements for the holding of a Handicrafts Display during April. (Secretary, Miss M. De Caux.)

KALANGADOO.

On 13th February members held a meeting at the residence of Mrs. J. Hunt, and inspected the beautiful display of dahlias and vegetable garden. Four new members were enrolled. (Secretary, Miss. W. Dangerfield.)

KARTE.

Household Hints.

On 24th February members met at Mrs. Gum's homestead. Appreciation was expressed at the action of the Belalie and Clare Branches in sending books to Karte. Five new members were enrolled. The following hints were given:—Milk is a substitute for soap in the kitchen. A little put into hot water will soften it and give dishes a fine gloss. Cups and saucers which have become stained with coffee or tea can be cleaned by scouring them with baking soda. When washing linoleum have the water hot and melt into it 1 dstspn. of cream floor polish, then wash as usual. If given a daily rub with an oil mop the result will be quite as nice, but much safer than a highly polished floor. This saves a lot of hard work, yet the floor always looks as though it has just been polished. Put some cloudy ammonia in the water when cleaning windows, and there will be no smears or marks. When short of stale breadcrumbs for seasoning, &c., add a little flour to fresh bread and it will crumb easily. To clean windows, rub methylated spirits with tissue paper to keep off flies. Save cold tea to clean windows and it leaves no smears. If scissors are placed in hot water for a few seconds before cutting any flimsy material, such as chiffon, &c., a clean even edge will be obtained. For sewing such material, use strips of paper to prevent it from puckering or slipping away. After it can easily be torn away. To whiten discoloured clothes, soak them overnight in a solution of 1 tspn. of cream of tartar to 1 quart of cold water. Wash in the usual way. When meat becomes tainted during hot weather, a generous sprinkling of vinegar will keep it fresh overnight. If cooking immediately, it can be sprinkled in the meat dish before placing in the oven. This not only removes the taint, but gives the meat a delicious flavour. To clean the copper, put the dirtiest soapsuds in it after the day's washing and leave for 2 days. Then empty, and the copper will be shiny. When washing woollen socks for the first time peg them on the line when well stretched by the toe and heel, and they do not shrink. To remove iron, rust or ink stains, squeeze lemon juice into a cup and add a pinch of salt. Then rinse in water. Jam bottles often crack when pouring hot jam into them. Stand the bottles to be filled on a wet cloth and it will prevent the glass from cracking. Add vinegar instead of salt to the water in which vegetables are washed. Vinegar makes insects drop and salt makes them cling. To remove the "fur" from the inside of a kettle, dissolve 2 tspns. of borax in the kettle full of hot water. Boil for 15 minutes and the fur will be loosened and easily removed. If a garment is scorched when ironing, rub with soap and put out in the sun and the mark will disappear.

KYBYBOLITE.

Mrs. L. De Garis of Naracoorte gave a demonstration of Macrame work at the meeting held on 26th January, which was attended by 15 members and 9 visitors. On 11th February members attended a combined meeting with the men's Branch to hear Mr. R. C. Scott speak on New Zealand. (Secretary, Mrs. M. Kekwick.)

LAURA BAY.

Using Up Scraps.

At the meeting held on 9th February, Mrs. E. C. Lowe read a paper on "Home Nursing." Mrs. J. Blumson read the following paper:—

Many scraps of food that are quite good accumulate in the kitchen safe in the course of a few days. There is no end to the usefulness of gravy and sauce. Even a spoonful or two comes in handy to moisten the mixture for rissoles, to stir in salmon patties, or to add to a rather dry and insipid cold meat mince. Brown gravy, in any case, can always go into the soup or stew, enriching it and colouring it without extra cost.

Scraps of mashed potatoes can be fried or used on top of Shepherd's pie or padding for rissoles.

Cheese—especially when purchased in small quantities—is one of the worst offenders when it comes to unavoidable scraps. Still, the dry ends are easily grated and are most useful to have on hand. Add them to potato dishes, and also to macaroni.

Rice left over from curry will make a nice custard with the addition of milk and eggs, and save the bother of first boiling the rice. Use ends of jam to enliven a curry or place in the bottom of the basin that holds a steamed pudding. Never throw out pieces of bread. Bake them in a fairly slow oven until they are a pale-brown. Then either roll them out finely or put them through the mincer, and when cold, store in an airtight jar for coating fried foods.

Household Hints.

Mrs. A. Lowe gave the following hints:—Paint marks can be removed by rubbing, when fresh, with turpentine or kerosene. To keep poached eggs firm when cooking, add a little vinegar to the water. To rid wardrobes and cupboards of moths and their eggs, burn sulphur. When marking linen, the ink will take more smoothly if the words are first written lightly in pencil. To remove paint stains from glass, rub the stains with a cloth wrung out in hot vinegar. Cloudy ammonia will remove most fruit stains if applied before the garment is washed. Tartaric acid will remove onion stains from the hands. Tomato stains can be removed by sponging with eucalyptus and hanging in the sun to dry. If new trousers are rinsed out before being worn, they will not be hard to wash when dirty.

A further meeting was held on 9th March at Mrs. Bowell's residence, and took the form of a biscuit competition. Mrs. E. Lowe was the successful competitor, making 19 different kinds of biscuits from the one recipe, and Miss L. Blumson tabled 17 varieties. Mrs. Lowe read a paper, "Tomato Growing in Dry Localities." (Secretary, Miss. R. Blumson.)

McLAREN FLAT.

Products of the Vine.

Mrs. W. Maidment gave an instructive talk, "Pickle and Sauce Making," at the meeting held on 4th February, which was attended by 19 members. Mrs. V. Wade of Willunga read the following paper at the March meeting:—

Vines are extensively grown in this district, and there are many ways of using the fruit, apart from the usual dried currants and raisins for cooking. Grape juice is extracted from the fruit when ripe by adding water and sugar and boiling for 15 to 30 minutes, then strain and bottle. If sealed while hot it keeps a long time, and has many uses. Vinegar ketchup and catsup can be made for any grapes; pickled grapes are very nice with cold meat. Grape sauce is equal to any on the market, and is often preferred to tomato sauce. Grape chutney, with or without tomatoes added to the ingredients, is excellent. Grapes may be preserved in syrup for use out of season. All varieties of grapes may be used for jam—Grenache, Mataro, Shiraz with apple, and Sweetwater. The latter is rather sweet, and would probably be improved by the addition of apple. Jam and jelly may also be made from Zante currants, the jelly being particularly attractive. Crystallised grapes are delicious and will keep for a long time if packed in an air-tight jar, with layers of grease-proof paper. They must be kept free from moths.

Mrs. Wade gave instructions for crystallising grapes of all kinds, sultanas and currants. Various recipes were supplied, including the following:—

Grape Sauce.—4lbs. grapes, 1lb. each apples and onions, 1oz. garlic, 1lb. sugar, 1oz. allspice, 2 tbspns. salt, 1 oz. peppercorns, ½ tspn. Cayenne pepper, 2 cups vinegar. Boil 2 hours, strain and bottle while hot.

Grape Chutney.—4lbs. grapes, 3lbs. each tomatoes and apples, 1lb. sultanas, 1oz. garlic, 2 tbspns. salt, 2 tspns. ground ginger, a little Cayenne pepper. Cover with vinegar, stand over night. Boil 2 hours; or, 4lbs. grapes, 3lbs. each tomatoes, onions, and brown sugar, 1lb. sultanas, 1oz. garlic, 2 tbspns. salt, 1 tbspn. ground ginger. Cover with vinegar, stand over night, and boil until thick. (Secretary, Miss F. Bell.)

MILANG.

Question Box.

Fourteen members attended the meeting held on 19th February, which took the form of a "Question Box".

What do you consider the best feed for poultry?

Answer: The majority favoured a bran and pollard mash once a day with wheat or barley once a day, meat meal varying in proportion according to the time of the year, and unlimited green feed.

What colour would you tint walls to make a small room appear larger?

Answer: Light pastel shades, preferably primrose or other pale yellow shade.

Do you believe in the use of comforters for babies?

Answer: No, because they tend to spoil the shape of the child's mouth and formation of its gums, and encourages adenoids.

How would you prevent mould on jam?

Answer: See that it is sufficiently boiled and the jam jars quite dry. Then try sealing with paraffin.

Why does a cake go dark in cooking when ingredients and mode of making are as usual?

Answer: Probably Self Raising flour contained too much soda.

Should the nest of a setting fowl be damped during this warm weather?

Answer: During the third week of setting, the eggs should be thoroughly damped unless in the event of rain damping the ground. (Secretary, Miss R. Whitfield.)

MILLICENT.

Pickle for Mutton or Beef.

At the meeting held on 19th February, the 2 following excellent recipes were given:—

Preserving Beans: Half fill a kerosene tin with water, add 5 cups of salt and 1 cup of sugar. Boil and skim, and while boiling, put in the meat which has been cut into convenient pieces for cooking. Then boil 15 minutes. Take off the fire and cool as quickly as possible. Meat done like this can be fried, roasted or boiled. To make it red, add another cup of salt ½ tspn. saltpetre.

Prepare beans in the same manner as for cooking—string and slice them finely. Put a layer of salt in the bottom of a jar, then a layer of cut beans, and continue with alternate layers until the jar is full. Finish off with a generous quantity of salt. Leave overnight then fill jar again. When full, put a piece of flannel on beans and paste top of jar over. Before cooking the salted beans, place sufficient in a colander and allow water to run over them to remove salt. Cover with water and bring to the boil, then strain and put on a fresh lot of water. Cook as usual only do not add any salt. (Secretary, Miss K. Hutchesson.)

MONARTO SOUTH.

Mrs. White presided over an attendance of 11 members and 7 visitors at the meeting held on 20th February. Mrs. C. Hallett of Murray Bridge gave a talk on a trip through Europe. **On 20th March, Miss E. Hein was elected President and Miss R. Bretag read a paper "Summer Sweets".** (Secretary, Mrs. F. Liebelt.)

MORCHARD.

Household Hints.

Eighteen members attended the January meeting. After arrangements had been made for the Annual Show, Mrs. W. Martin read the following paper:—

To make whipped cream go much further, fold in the white of an egg. To test the freshness of an egg, place it gently in a bowl of cold water. If it immediately sinks to the bottom and lies flat it is fresh, if it floats on the top, it is not usable. Mix pastry with a beaten egg and a little water, instead of all water, and it will keep fresh for several days, even in the hottest weather. The eating of cheese every day is to be advised. Topping off a meal with cheese instead of a rich, sweet dessert, might well vary the routine. Cheese contains protein, fat and mineral elements, and is readily digested when not eaten in excess. Bread, butter and cheese, with some fruit is an ideal meal for good health in hot weather. To keep cut flowers fresh, dip the stalks in powdered starch before putting them into water. To rejuvenate a worn leather belt, take a raw bone, scrap it clean, and rub the belt with it. Finally polish it with a soft cloth. If a white straw hat is shabby, rub Fuller's Earth into the straw. After this has been brushed out, beat up the white of an egg and paint it over the hat. If bone handles of knives are discoloured, rub them over with a pad of cotton wool dipped in peroxide of hydrogen. Avoid dipping in hot water. To set a jelly quickly without using ice, soak a cloth in a mixture of equal parts of milk and methylated spirits, wrap this around the mould or basin containing jelly and place in a draught. If shoes have thin soles and are liable to let in the water, they will greatly benefit by a coat of colourless varnish over the soles. Tired, aching feet may be relieved by soaking them 10 to 15 minutes in hot water, to which bath salts have been added. Dry thoroughly, and massage them firmly with olive oil.

A social afternoon was held on 24th February. (Secretary, Miss F. Brown.)

MUNDALLA.

The February meeting was devoted to dealing with matters in connection with the South-East Conference. Mrs. Golding presided at the March meeting, the following members giving hints on "Stiches", "Hemstiching", Mrs. Newland; "Tatting", Miss Knowling; "Harebell", Miss I. Donnell; and "Crochet", Mrs. Packer. This meeting, the Secretary, Miss Jones reports, proved very instructive.

MURRAMINGA.

Murraminga, one of the recently formed Branches on the Far West Coast, held a meeting on 6th March, at the residence of Mrs. J. Hunt. Each member brought along a recipe and a household hint, the best of which it is proposed to copy into a book which will be handed around to members desiring to make use of them. (Secretary, Mrs. F. Roberts.)

MYPONGA.

The Chief Dairy Instructor (Mr. H. B. Barlow) addressed the February meeting. One of the best attended meetings that the Branch has yet held was on 11th March, when Dr. Souter gave an address "First Aid". Twenty members and twenty visitors were present. (Secretary, Mrs. Bounds.)

NARRIDY.

General Branch business was discussed at the February meeting. The meeting held on 18th February was an outstanding success, 30 members and 45 visitors from Koonunga and Georgetown being present. Musical items were interspersed with the reading of papers by Mesdames Whitehorn & Powell. On 6th March members met to discuss arrangements for the Flower Show on 19th April. (Secretary, Miss B. Reynolds.)

NELSHABY.

Samples and recipes of summer drinks were tabled at the January meeting. On 25th February recipes of salads were exchanged. (Secretary, Miss A. Lawrie.)

O'LOUGHLIN.

Economy and Useful Hints in the Home.

Twelve members were present at the February meeting, which was held at Mrs. C. Kloeden's residence. Miss E. Handtke read the following paper:—

During and since the depression many housewives have had to face hardships. More so than the men the housewife has been compelled to deprive herself and her family of many comforts. Where the woman entirely depends on keeping the house on her income from butter, eggs, cream, vegetables, &c., or if she is gifted with sewing, knitting, or hairdressing, it is surprising how much money she can make annually. But she has to work with her head more than with her hands, for she has to consider the expense of everything before purchasing. It is not always economy to buy the cheapest article. For instance, 1lb. of tea at 2s. 6d. will make twice the amount of tea than 1lb. of tea at 1s. 8d.

To save stockings, sew two or three thicknesses of velvet or flannel together, then cut to fit the sole of the shoe and paste it in. Lamp and candle lighter: Roll any waste paper together fairly tight, about the thickness of a lead pencil, and about 1ft. long; just hold in the fire and then light the lamps. Lino. polish: Save all bits of candle which collect in the candlestick; when about a ¼lb., melt slowly and add equal part of turpentine to the grease; this will make an excellent floor polish, and may be used either in a liquid or paste form. Instead of buying any pot cleanser, pure ashes are a very good substitute. Ashes will remove any grease or stains on piedishes, pots, pans, copper, &c. When sewing, darning, patching, and mending save every piece of thread, scraps of material or rags. These can be cut up or torn into very small bits; these will make very useful fillings for cushions, bolsters, pillows, and mattresses. Pillows stuffed with these materials are much more hygienic than those made of kapoc or feathers. (Secretary, Mrs. E. Lutz.)

OWEN.

The Scone Competition held under the auspices of the Branch on 11th February resulted in a win for Mrs. W. J. Marshman, second prize being shared by Mesdames H. Helps and C. Marshman. (Secretary, Miss M. Lake.)

The Owen Branch was formed in May, 1936, and as this will be the first opportunity that members have had of participating in a District Conference, they are showing marked interest in the gathering that will be held at Wasleys during February, and will stage an exhibit at the Conference. Matters in connection with the Conference were discussed at the January meeting.

PARILLA.

Mrs. Les. Foale read a paper "Vegetable Salads" at the January meeting. She also exhibited samples of salads made from her recipes and gave members the opportunity of inspecting her garden. (Secretary, Mrs. Welden.)

PARRAKIE.

After being in recess for the harvesting months, members met on 24th February, the meeting taking the form of a "Question Box." Seventeen members were present. (Secretary, Miss J. Halliday.)

PENOLA.

"Floral Work" was the subject of a paper and demonstration given by Mrs. W. Clifford at the meeting held on 3rd March. Mrs. Kidman was thanked for the valuable work she had performed as Secretary of the Branch since its inception in 1931. Miss A. Marks agreed to undertake the secretarial duties.

PINNAROO.

For some years past this Branch has conducted an Annual Cake and Flower Show, and the meeting held on 5th March was devoted to making the necessary arrangements for the function, which will be held on 7th May. (Secretary, Mrs. L. Wirth.)

RENDELSHAM.

Rendelsham held its monthly meeting on 10th February, when a paper, "Sauces and Pickles" was contributed by Mrs. Andrews. (Secretary, Mrs. Z. Bignell.)

SADDLEWORTH.

Arrangements in connection with the Dahlia Show to be held in April were discussed at the meeting held on 2nd March. Miss D. Coleman reported on the Lower North Conference. (Secretary, Miss G. Frost.)

SHEOAK LOG.

Mr. A. J. Cooke (Member of the Advisory Board of Agriculture) attended the March meeting, at which 34 members and visitors were present, and spoke on "Milk and Its Products." (Secretary, Miss K. Koch.)

SNOWTOWN.

Convened by Mesdames Pellew and Thomas, the February meeting took the form of a social afternoon. On 4th March Dr. A. White addressed members on "First Aid and Common Maladies." (Secretary, Mrs. M. Jenkins.)

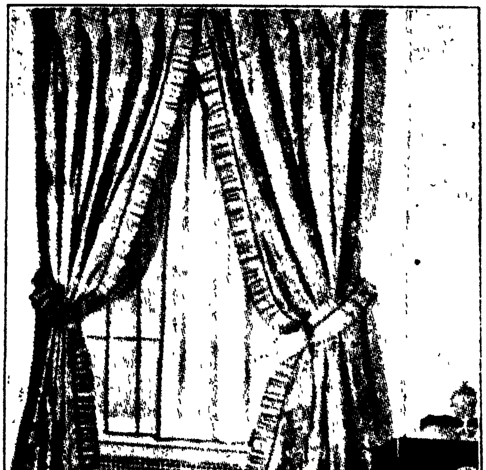
STRATHALBYN.

To celebrate the conclusion of the first year of work, a social evening was held on 12th February. Representatives were present from neighbouring Branches—both men's and women's—and the Assistant Secretary of the Agricultural Bureau, Mr. F. C. Richards, congratulated the Branch on having completed so successfully its first year's operations. (Secretary, Mrs. C. Hudd).

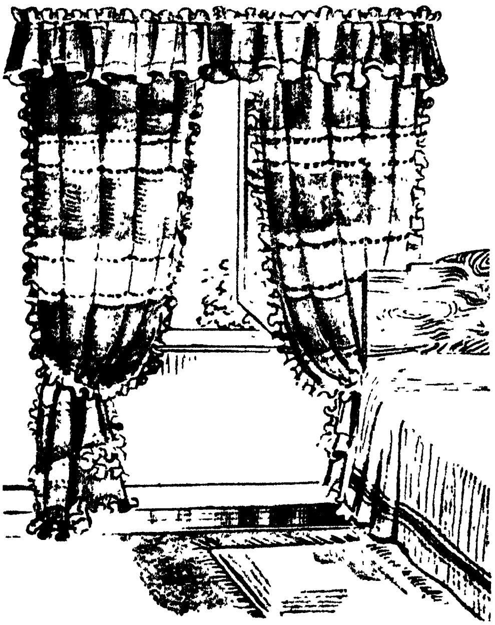
Making and Hanging Curtains.

Miss Jean Elliott read the following paper at the March meeting of the Strathalbyn Branch :—

To make good curtains, the first thing to consider is the way they are to be hung. Really good fittings that will run smoothly and will not get out of order are of first importance. When getting fittings, the size of the window and the weight of the material which is to be hung on them should be taken into consideration. Good railway runners to take the weight of any curtains in the average home are obtainable from all ironmongers. They are very easy to fix, being adaptable for the overhead board or on the face of the window. It is a good idea to wipe them occasionally with an oiled cloth, to keep the little wheels running easily.



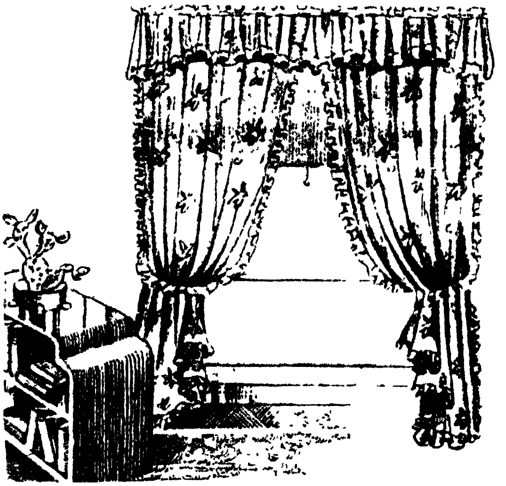
Nowadays a curtain pole is not often used for big curtains, as they need such a strain to move the curtains, and this handles them badly. Pulleys are seldom very successful. Having decided on fittings, fix them in place and then take measurements. Decide where the curtains are to come to in length. The recognised lengths are to the sill, 2in. below the sill, to the top of the skirting board, and 2in. from the floor. Any of these is correct; the length chosen depends on the kind of window. A window with a wide sill should have curtains ½in. above this. If they touch the sill they get very dirty.



A window in a door must always have its curtains 2in. off the floor, or they will not look correct when drawn. If the room is low, and the curtains are made to hang 6in. below the sill, the room appears higher. All other lengths are optional. Always consider the furniture that will be used near the curtains. A big couch in a bay window with long curtains at the back may look very heavy. A radiator, window seat, or wash basin may all influence the length of the curtain chosen. Allow 4in. on to the length of the curtains for turnings, and then work out how many widths of material are required.

The width of most curtains should be half as much again as the width of the widow. If a window is 8ft. across, three widths of 48in. material should be used to equal 12ft. This will allow a nice fullness when the curtains are drawn together.

Materials.—If the material is patterned it needs only half as much fullness: but, on the other hand, a taffeta or thin plain material of nearly double fullness to look really nice when drawn together. The kind of material of which a curtain is made depends on the room and the general scheme. Velours are generally suitable for a dining room, smoke room, or a draughty hall that wants to look cosy. The pile of the velour should always go down on the curtain. The more modern materials are crashes and both plain and patterned. Oatmeal colour is very fashionable at the moment, either in plain or striped, and some woven patterns and slub satins, too, are popular. Silks, taffetas, and brocades always look well in a lounge or bedroom, and cretonnes and chintz are suitable in children's rooms or bedrooms. For a patterned wallpaper and carpet, choose plain curtains, or the scheme will look unrestful.



Cutting.—If the material is patterned, then this pattern must join and match all round the window. So when buying the material tell the salesman the length of the curtain, and he will see you get the correct quantity to match up the pattern. If making a pelmet or valance, you can get first a curtain length and then a pelmet or valance length, and the pattern will come right for the next curtain length.

Curtains also look better lined (casement cloth is very cheap). They hang better, and when the window is open the lining protects the material from sun or rain. Whatever the colour scheme inside the room, use the same coloured casement for lining throughout the house. This looks much better from the outside than different colours at each window.

Curtains are not very often interlined, unless the window is very high (say, 11ft. to 12ft.), when interlining gives body to the curtains. If the window is very draughty and cold, interlined curtains make it more cosy.

Braid is never advisable round the edge of curtain. Yards and yards are needed, which adds to the expense, and most braids are affected by the atmosphere. On a wet day they shrink and curtains look puckered, and it is very difficult to get them to look flat in the first place.

Fittings and Hanging.—Take for an example a bay window with French doors. All other curtains are made on the same lines. The railway is fixed on a pelmet board, 2in. in from the front of the board to allow plenty of room for the curtains behind the pelmet. A pelmet will be fixed on the front of the board. Imagine that the whole width of the window is 13ft. all round; therefore we will require two lengths of railway, each 7ft. long, which will allow an overlap in the centre. With this fixed, measure from the tiny ring on the runner to within 2in. from the floor (we will presume the measurement to be 8ft.); so we will require five widths of 48in. material (20ft.), 8ft. long, with 4in. turnings, which is 13¾yds. of material, and the same of lining. This will make one pair of one-width curtains and one pair of one and a half width curtains. Cut the material in five lengths of 8ft. 4in. each, and cut one strip of the material and one strip of the lining down the centre for the half widths. Join one each of these to a full width length to make a wider pair of curtains for the centre of the window. Press these joins open very well, also any centre creases where the material has been folded.

For fixing the lining, use a good square table. You will also require a 3ft. wooden ruler, a box of pins, a long needle, and thread to tone with the material. Lay the material on the table face downwards and lay the lining on top. First turn the material and lining over 1in. for the top turning and pin them across to keep them in place. Measure 3ft. from the top and put pins across, also down each side to keep the two materials together for stitching. Then fold the lining back to the pins and tack the two (lining and material) together loosely, in a wide blanket stitch. This holds them together when hanging, and the stitches will not show, as only a little of the material is taken up with each stitch. Put the lining back in place and pull the curtain along the table ready to measure off another 3ft. Stitch together as before. Remember to keep the lining looser than the material, because very often the material drops when hanging, and lining does not often stretch. Pull up the curtains again and measure off 2ft. Turn up the bottom of the curtains. The one and a half width will be too wide for the table, so pull it across the table each time to the whole width and work downwards to the bottom. Remember to fix these two wide curtains so that the half widths face.

Then the hems. Nick all the several edges as they are inclined to pucker the curtain, and then begin stitching round the curtain by hand. A 1in. hem is used down the sides, turning in the lining and the material together. Hem with a stitch about ½in. long, but do not go through the front of the curtain with this stitch. In under the lining, out about ½in. further along, catch the front, then in again under the lining, practically level where you came out. Do both sides and then hem across the bottom, in case the curtain shrinks when being cleaned. See that the corners look true on the right side of the curtains. You will find it easier to turn them up true instead of mitring them, which needs the material cut away.

Top Headings.—For quickness some people machine a draw tape along the top of the curtain and pull it up to the size required. A better way is to gather up the material by hand and stitch it on a binding of about 1½in. in width. Cut strips of binding 2ft. 9in. for the single curtains and 4ft. 6in. for the one and a half width, which allows extra play for them to meet well in the centre.

Divide the curtain equally and pin it on the binding. Go straight across the top about a ¼in. down from the top of the curtains, draw it up and hem the binding to the curtain. Gather the curtains again about 1in. down from the first gathering, and stitch it to the binding. Then with a strong double thread stitch the hooks on 4in. apart. If you wish to be very neat, stitch a piece of casement 1¼in. wide under the hooks to neaten off the head and cover the binding.

Press the hems well down the sides, take out all pins, and press any very bad creases on the front of the curtains. Hang them on the runners, the two single widths at each end and the one and a half widths facing in the centre. A day or two hanging will take away any creases there may be, and they will naturally take proper fold, which you can encourage to go the right way as you draw them.

TANTANOOLA.

Jam Making.

Mrs. Wilson read the following paper at the December meeting:—

If a good colour is to be obtained, the fruit should be quite ripe, but firm and sound, this not only produces a nice bright colour but adds to the flavour of most jams, especially apricots, plums, peaches, and figs. In berry jams, the fruit should be on the green side. Gooseberries are made into jam while quite green, but full-grown. This is a good recipe:—3lbs. gooseberries, 3 pints of water, 6lbs. sugar; boil sugar and water 10 minutes then add fruit and boil 1 hour or until it jellies. Loganberries and raspberries blend well for jam or can be made separate to the same recipe:—6lbs. loganberries (not too ripe), 6lbs. sugar, and 2 pints water; boil water and sugar together for 5 minutes, then add berries and boil rapidly for 15 to 20 minutes. Loganberry and cherry plum make a very nice jam. Boil 3lbs. cherry plums with 1 cup of water, then add logan berries and boil 10 minutes, then add

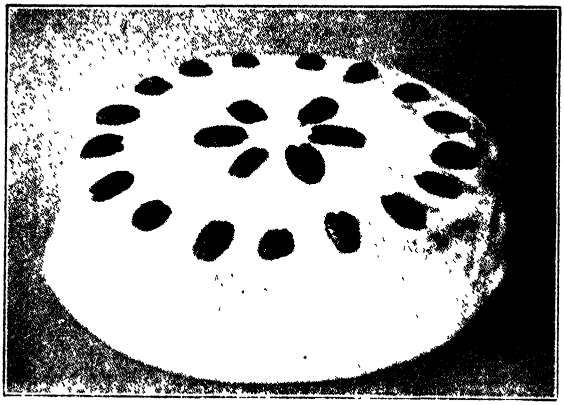
4½lbs. sugar, after that dissolves boil fast until a good consistency.

Apple Jelly.—Use green windfalls cut in quarters, cover with water (a handful of cloves adds to the flavour), tie in muslin and boil with the apple until the apple is soft but not broken. Strain the juice and add cup for cup of sugar and juice, then return to the pan and boil hard for 20 to 30 minutes.

Quinces can be done in much the same way, remembering that the fruit should be still green.

Cooking Competition.

Mesdames Alcock and Rielly judged the entries in the Cooking Competition conducted by the Branch and made the following awards:—Pound cake: First prize, Miss K. Hutchesson; second prize, Mrs. Edgecumbe. Sultana cake: First, Mrs. Pycroft; second, Mrs. Bird. Best Six Scones: First, Mrs. Bird; second, Mrs. Edgcumbe. Cornish Pasties: Mrs. Bird. Light Sponge: First, Miss M. Pycroft; second, Mrs. E. Telfer. Chocolate Sponge: First, Mrs. Bird; second, Mrs. W. Stafford. Lamingtons: First, Mrs. Peters; second, Mrs. Bird. Yeast Buns: First, Mrs. E. Telfer; second, Mrs. J. P. Burchard. German Cake: First, Mrs. E. Telfer; second, Mrs. J. P. Burchard. Nut Loaf: Mrs. J. P. Burchard. (Secretary, Mrs. Gus. Altschwager.)



WARRAMBOO.

The meeting held on 26th February was attended by 14 members. Mrs. A. Collins read a paper, "Biscuit Recipes." It was decided to hold a competition at each meeting, such as cooking, needlework, basket making, &c., for which points would be awarded to the first, second, and third place getters, and at the end of the year the competitor gaining the highest number of points would be awarded a trophy. This appears to be an excellent way of maintaining interest in the work of the Bureau, perhaps other Branches will adopt the suggestion of the Warramboo Branch. (Secretary, Miss E. Steer.)

WASLEYS.

In December the Wasleys Branch held a Recipe Afternoon, exhibits of the produce made from the recipes being shown by Mesdames Day and Sanders and Misses Oliver and Day. On 4th February members discussed arrangements for the Lower North Conference, and it was decided to hold a Flower Show in April. (Secretary, Miss K. Harding).

WEPOWIE.

Transplanting.

The meeting of 4th November was held at the residence of the Secretary, Miss E. Rocke. Mrs. H. Noske read the following paper:—"Transplanting is one of the most important operations in horticulture, and it is not always given the consideration necessary to get the best returns. From the smallest seedling to the largest tree moved, the best results will be obtained if a ball of earth is retained round the roots when moved. In the case of trees obtained from a nursery, if to go any distance, this is a difficult matter; but if the roots have been well immersed in a suitable puddle, and the trees carefully packed, the danger of loss will be very much reduced. Lift each tree out of the package carefully, and place on a wet sack, putting another wet sack over them.

The transplanting of flowering annuals and seedlings in the vegetable garden is more successful if each plant is moved into its growing quarters with a ball of earth round the roots. Naturally, this slows down the operations very much, and would be impracticable where large areas were required to be planted; but in the case of the cottage gardener, where only a few plants are put out at one time, the extra work is well worth while.

Perhaps the most popular and satisfactory of all summer annuals that can be raised is phlox. A bed or border of these make a glorious show, and the colours to be obtained are in advance of anything known a few years ago. I think you obtain a better effect by massing one colour, and as the seeds can be obtained separately, there is no difficulty in doing this.

The petunia is beautiful, not only for the brightness that is given to the garden by its bloom, but delightful for the fragrance that it throws off in the evening. Petunias generally need helping to make bushy plants. Do this by pinching back the seedlings and repeat the process with the branches, until the plants are well furnished. More attention might be given to plants that add beauty to the garden by their perfume, as well as by the glory of the shape or colour of their blooms.

Keeping Cut Flowers.—The life of fresh flowers depends on several things. If they were old when picked they cannot be expected to last very long. For best results cut the stems on a slant with a sharp knife or garden shears. Cut very early in the morning or late in the evening. Both poppies and dahlias are flowers that many people are unable to keep fresh enough for decoration; if gathered in this way, and preferably when in bud ready to burst or only half open, they will last a number of days."

WILLOWIE.

Willowie, situated in the Upper North District, is another recently formed Branch, and held its third meeting on 3rd February. A paper on tomato growing and one on tomato recipes were read by Mesdames Foulis and Bartlett respectively.

Another meeting was held on 3rd March which was attended by 10 members. Numerous recipes of biscuits were exchanged and samples of biscuits exhibited. (Secretary, Mrs. P. Foulis.)

[It is regretted that space does not permit of the publication of these recipes, but if requested the recipes will be forwarded to other Branches. —ASST. SECRETARY.]

WILMINGTON.

Soap Making.

The first meeting for the year took the form of a Social Afternoon and was held on 11th February with the excellent attendance of 24 members and 28 visitors. Two competitions were held, the prizes for soap making going to Mrs. Zwar and Mrs. Cole, and for buns to Mrs. Noll. The President, Mrs. Pengilly, read a paper, "Toilet Soaps and Candles," Mrs. Cole won the Duchess Set competition. The following paper was read by Mrs. Pitt:—"By making one's own soap much can be saved, especially when meat is killed on the farm, as there is usually a quantity of caul fat and any spare dripping which may be turned into a good soap with very little trouble and expense. I prefer boiling the soap, as I find it much better for lathering and not so rough on the hands as that made by the cold method. Care should be taken in handling caustic soda and also in destroying tins, especially where there are children. Caul fat should be rendered down and all fat be perfectly clean and free from salt. The following recipe is one of the most satisfactory; it makes a good hard soap, equal to that which is bought:—36 cups water, 1lb. caustic soda, 3 small packets Lux, 2 tbspn. borax, 1lb. resin, 6lbs. fat. Put all in a tin and boil two hours, stirring constantly, and care must be taken that it does not boil over; it is ready for use in a month. It may be turned out of tin the day after it is made and cut into bars. Another recipe:—6lbs. fat, 1lb. caustic soda, 2galls. water, 2 packets Lux, ½lb. resin, 2 cups kerosene, 2tblspns borax, and 2 knobs of blue. Boil all together (except soda) for three-quarters of an hour, then add soda gently and stir while it sets.

WIRRABARA.

Sponge Making.

Mrs. Watt presided over the meeting held on 21st January; there were present 29 members. Miss C. Hollitt read a paper, "Some Hints on Sponge Making." Most country housewives use the wood stove for cooking, and it is wise to light the fire, say, about one hour before baking, so that the oven becomes evenly heated. The heat required for a sponge should be higher than that used for fruit cakes, and slightly cooler than is required for scones, pastry, or small cakes. An oven in which scones or little cakes have just been successfully and quickly baked is about the right heat for a sponge. Too hot an oven for sponges browns the top at once, interferes with the normal rising, and the result is disappointing. Do not open the oven door for at least five minutes, then only for a glance. It is a mistake to put on wood whilst cooking a sponge and, indeed, most cakes, as it generally spoils the cooking. Place sponges as near the centre of the oven as possible; this gives an even temperature, and ensures a more even rising; open and close oven door very carefully.

Before starting to beat sponges prepare the tins, paper, &c., and have all ingredients ready at hand; medium high tins for sponges are preferable to shallow ones, as they allow the cake to rise to its full height without spilling. Too high a tin prevents the free circulation of air. The whole aim in beating a sponge is to introduce as much air as possible in each process; careless mixing will tend to give poor results. Success depends upon a well-proportioned recipe, long beating of sugar and eggs, careful weighing of ingredients, and right temperature of the oven. Miss Hollitt also gave a number of recipes.

At the February meeting Mrs. Francis read a paper that had been given at the Booleroo Conference. (Secretary, Mrs. E. Harding.)

Conference of Women's Branches at Wasleys.

There was an excellent attendance of delegates at Wasleys on 25th February, the occasion being the Annual Conference of Lower North Branches. Mrs. A. M. Wilson presided. An attractive display of art needlework and novelties was displayed by the Owen, Sheoak Log and Wasleys Branches. At the instance of Miss G. Harding (Wasleys), seconded by Mrs. Bowden (Sheoak Log), supported by Miss Coleman (Saddleworth), Branches were urged to give their support to the proposed school for women.

Miss E. Campbell, of the Education Department, gave an address and the following papers were read and discussed:—

The Annual Holiday with the Family.

[Mrs. R. L. Lines, Wasleys.]

A holiday—the very word brings to each one of us a thrill. It brings an excitement into our lives, something to look forward to, to work for, and with this goal in view to reward our efforts, we plod along with our work. It is not that we are discontented, for we love our homes and surroundings, but we want to enjoy for a time the excitement that civilisation has brought into the world, and the merry throngs on holiday. We find too, that a complete change is good for all, and goes a long way in helping to keep us fit and happy in our home life.

And now the actual holiday. when one is young, she will find that one of the most enjoyable holidays is spent with a number of young people in one party. This proves quite an expensive holiday, as we like to board at the most popular boarding houses, and usually the time is crammed full of pleasures, sight-seeing trips, tennis, swimming, theatres, dances, &c.

But time passes, and we branch off into married life. Then for anyone preferring a quiet restful holiday, I might mention the Gulf Trip as the most enjoyable. This holiday is most suitable for perhaps a married couple with no children—or perhaps one child, but it becomes a burden if attempted with more.

In planning a holiday later on with several children, our first thoughts are for them. Quite a nice idea with a small family, is to rent a bedroom with use of dining room and kitchen, to be shared with other boarders. I have noticed a number of girls renting a room and enjoying a holiday in this manner, as one could always go out for meals if one so desired. This idea also had its drawbacks, as one always had to have meals to fit in with the other boarders, when perhaps one family might wish for say an early dinner, but may not be able to do so on account of the others. However, it was a nicer way of spending a holiday with the children than other ways previously mentioned.

In whatever form the holiday is to be spent, quite a lot of preparing is necessary beforehand. If a family is going, see that everything is in readiness and nothing left until the last minute, as it is most exhausting and tiring if things are left to be done at the very last. Clothing comes first on the list, and we can make, wash, iron and pack away any garments we finish quite a time before the actual time of leaving. Judgment in this must be used, as to the style of holiday we are taking. Say this time we decide to take a flat at the beach—and quite nice ones can be obtained for about £4 a week, consisting of 3 bedrooms, dining room, kitchen, pantry, sleep-out verandah, and use of bathroom. This is really a home from home. In going for a holiday like this we first think what we can do to save any work possible before we go. We all know that the sea air is a great thing to sharpen our appetites. It is advisable then, in preparing, to make a number of cakes and biscuits that will keep for a week or two, to take a supply of eggs, butter, and anything else we will appreciate down there which would prove much more expensive to buy. Lighting expenses are quite cheap, about 1s. per week, gas, 3s. or 4s. per week—it depends of course on our carefulness and also the number to cook for. We have not got to worry quite so much about our frocks at the flat. It is quite a simple matter to rinse out and iron them with the electric iron. Again, judgment should be used in the style of dress. For morning wear we should make plain, suitable dresses for our light household duties. It is also advisable to dress the children in plain, easy-to-wash-and-iron frocks, with one or two better ones. Most flats are well fitted out with chests of drawers, wardrobes, dressing tables, &c., and to avoid confusion, each child should be given her own drawers and hanging space. Also the children should have their own soap, face-washers and towels for bathing and bathing. In this way they are made responsible for things, and there is less chance of losing anything this way. A holiday of this type in a flat enables us to have our friends visit us, and if possible, stay a few days.

A CARAVAN.

For a large family or party, camping or caravaning is the ideal holiday. This style of holiday was first thought of because of boarding houses not wanting children, and now we find young or old, rich or poor, all enjoying a holiday by caravan. All enter into this novel way of holidaying, and all think it is the nicest. We will need to provide as much eatables and tinned food as we can comfortably carry when going in a caravan. This means we will not have nearly so much work as we had when we rented a flat, as we have not the conveniences to cook with. Everybody understands the situation and does not look for better, and they enter into the holiday in the real holiday spirit. Clothing is the most difficult thing to cope with on a holiday of this kind—especially for children. We must take enough to last our holiday through. We can, of course, send them to the laundry, but for a big family this is rather expensive, so we might as well have something for our money and provide extra frocks.

The caravan has a fascination about it, something altogether different from home life. I feel, and I have heard others express their feelings in the same way, as if we have left or shaken off all our worries and troubles, and feel free. Most camping grounds are fitted up with every convenience, thus making camp life very enjoyable. We go to the seaside to get the good of the sea air, and by caravan or camping we are close to it and get every benefit we can from it. Some people might prefer the hills to the beach, but with a family the beach is by far the best place for a holiday.

In choosing a caravan we want to choose one that will be most suitable for the number going. A 6-berth caravan can be hired for £14 for a fortnight, or if travelling, 1s. per mile and driver supplied, if so desired. For travelling, the caravan is very comfortable, some being attached to the car as a trailer, others known as motor caravans with car and caravan in one. This is the type which we chose. The following will give some idea of the comfort and convenience in a caravan. A double door behind the driver's seat forms two rooms. In the back part, two long seats run along the full length of that room, forming seats by day, and at night, by pulling up the back of the seat, two beds, one above the other. The seats are beautifully upholstered, making most comfortable beds. Above the top beds on the roof of the caravan, closets to hold clothes and hats are fitted around. All bed clothes can be stored under the lower beds, the top lifting up like a big trunk. A door also leads in at the back of the caravan, thus making both rooms private. In the front room the back of the seat collapses and forms a double bed. In the day-time it is used for a seat with a table, the table being hinged to the back of the seat. Other devices include sink and drain, primus stove, wash bowl and pump, there being a 25gall. tank of water under the caravan, store cupboards and drawers, a wireless and electric light. A tent is supplied that can be erected from the side of the caravan, where we could have meals during the day and where folding stretchers are erected at night. A large trunk containing a folding table, and camp stools could be lifted off the back of the caravan and left in the tent, also forming a table.

Some people when caravaning, prefer to spend the time in travel. This is an excellent idea for 5 or 6 people, but with more, when tents have to be erected, it is better to choose a place somewhere where sport and similar forms of recreation may be enjoyed and make only the one stopping place.

The Home and the Child.

[Mrs. Nield, Wasleys.]

It is the ambition of very woman to have a home of her own. However humble, it is her greatest pleasure to arrange and design a comfortable home. Housework need never be drudgery with modern appliances, good management and bright conditions. In these days of colour and light, our home can become very attractive at little expense. Shadow tissue or cretonne for covers and curtains help tremendously. The kitchen, particularly, should be bright—the fashionable "green kitchen" is a good example.

Home is a place of rest and comfort. A healthy home is built up by good management, including balanced meals, restful chairs and lounges and plenty of fresh air.

Care of the Children.

Motherhood develops the greatest instincts of true womanhood and love. With our Baby Welfare Centres, the mother can obtain all the help she needs as regards feeding, &c., but the care of the child does not end with the feeding and necessary attention. The development of temperament and disposition are both very important. Children should not be excited or overtaxed. In order to manage children, we must borrow their eyes and their hearts, see and feel as they do, and judge them from their own point of view. This does not mean they should not be corrected; but reason with them, striving to convince the young life of its mistakes and folly without crushing the little mind and depriving it of its own individuality.

Children should be encouraged to invite their friends to the home to share their happiness "Happiness is not perfected until it is shared."

Parents should interest themselves in their children's pleasures and hobbies. This helps to develop companionship between parent and child, companionship being a wonderful foundation to confidence, the latter being the keynote of success in training a child. The little ones should be encouraged to look at good picture books, have stories read to them, and when old enough, have good books to read for themselves.

Educating the Child.

The school-going age comes to all too soon for most mothers. Six years of age is soon enough for any child to commence school. If she starts earlier than 6 she is ready to further her education at high school, &c., at an early age. For the country child, this means boarding away from home, and a child of 11 or 12 years is too young to leave home, they need the thoughtful mother to help them in their daily life. The child who is fortunate enough to gain an Exhibition in the Qualifying Certificate examination should certainly be allowed to make use of the success, but for the one who passes the exam. without honours, I favour the second year in grade VII. at our primary schools. Even if they do not gain high marks in the exam the second year, they are more fitted for the further studies, are older and realise the value of their education in later life.

Every child—where possible—should be given an opportunity to gain the Intermediate Certificate (the man whose health has failed has a much better chance of obtaining a position, the woman who is left a young widow has something to help her).

Our Education Department offers wonderful opportunities for both boys and girls at various courses at Technical, Central and High Schools. Boys—farmers or a profession. Farmers' sons can gain all the knowledge they need with two or three years at High School or Higher Primary School, by taking Agriculture, Science, Woodwork and Bookkeeping, in addition to the usual English subjects.

By that time the boy should be at least 16 years of age, old enough to help on the farm and balance up his knowledge gained at school with the practical farming methods of his father. There are various other professions for boys, and they can obtain a good foundation for whatever course they choose at a High School.

THE COUNTRY GIRL AND A PROFESSION.

The girl has many avenues to choose from; every girl should have an Intermediate Certificate, as then she has always a better chance of getting a position or starting out for a profession, if circumstances compel her to earn her living.

In many cases, a profession is not thought of for our country daughter. The farmer and his wife usually have a few extra cows to milk for each daughter as she finishes her education. Perhaps this is selfish, for in many instances the girls would be happier without the cows, and earning their living in some professional way. The business course is not to be recommended for the country girl, as this means boarding away from home, and the wages are not high enough until she is of age, for her to keep herself.

Nursing is a fine profession for girls. They have a year or so at home to become domesticated before entering a training hospital. The Education Department also offers various good careers for girls. The old idea of keeping the girls at home on the farm against their wishes is very unfair. In the case of the only daughter, it is often a case of duty for her to remain home. If this is the case, the girl should be given greater opportunities whenever possible of sharing the advantages of other girls, and also have some accomplishment which will prove beneficial to her if she is compelled to earn her living.

HELPING OUR CHILDREN.

Children should be trained to value money and appreciate the necessity for thrift and economy. The Penny Bank system in our schools is the first stage that a child realises the idea of saving. On the farm a child can be given a lamb, calf, or perhaps a pig to sell on his own account. This gives the child an interest and a desire to have money of its own. From pocket money they should be encouraged to buy some articles they desire, such as a good book, a cricket bat or tennis racquet. From this, the idea of saving for an objective will develop.

As parents, we naturally wish to see our sons and daughters get a start in life. It is the price of every successful farmer to have his sons started on other farms. The sacrifices we make should not be burdens to ourselves. Our children have youth before them, and are better able to carry the strain. The parents should have years of rest and enjoyment before the sunset of life.

What can be more soothing to the aged couple than to realise that their family has made a success of their ventures in life, either in a profession, a business career, or as an agriculturist.

The Farm Mutton Supply.

[MRS E. W. DAY, Wasleys.]

Most homes in the country have the meat supply killed on the farm which proves more economical and provides the choicest of meat. A whole sheep is rather a large quantity for one family to deal with, therefore it is advisable to secure one not too large, weighing somewhere about 40lbs. This handy weight can be managed quite easily in summer, providing it has been killed in suitable weather. For instance, store lambs bought 6 months ahead are ready for killing at 12 months old, giving meat at very little cost, and with the extra growth of wool, the skin increases in value. Store lambs bought in November at a cost of 14s. 6d. a head, shore 3s. worth of wool, reducing the price per head to 11s. 6d., and are now being slaughtered for meat weighing about 40lbs. The skins realise 7s. each when sold to the skin dealer, leaving 4s. 6d. for meat, which works out to about 1¼d. per lb. In another few months, as the skin increases in value, they will be the value of the price paid for the lambs; hence the cost of the meat is almost nil.

Sheep of this age, apart from the advantage of being handy weights, are much nicer meat. The best time to kill a sheep is late in the evening. The carcass should be hung over night in any cool spot available—in summer preferably under a tree, where it will receive any cool breeze that blows. As early as possible in the morning the carcass should be cut into sections. First cut in halves, starting from the tail and cutting down as near as possible to the centre of the backbone. Then cut off forequarter, cutting 6 ribs from the front of the sheep. Remove the kidney fat, and the meat is ready to be hung in a safe. It should be hung out at nights, whenever possible, to keep it fresh. If the weather is hot, portion should be pickled in a brine made of salt and water, enough salt being dissolved in the water for an egg to float, with about ½ teaspoon of saltpetre.

The sheep is the most profitable animal on the farm and scarcely anything is wasted. The skin is sold, all surplus fat, including caul is rendered down and either made into soap or sold. All fresh parts of the sheep can be cooked in various ways, the head cut up and boiled with the tongue makes delicious potted meat or soup.

The brains fricasseed or dipped in batter and fried, make tempting dishes. Kidneys may be used for flavouring pies. The liver, sliced and fried and served with bacon rashers, makes a good breakfast dish. In dealing with the larger joints, one usually boils the knuckle ends for soups or broth.

Larger joints are mostly used for roasting. The leg is a favourite roasting joint; the loin stuffed with seasoning, rolled and roasted, and served cold with salads, pickles, etc., is very nice. The shoulder boiled and served hot with the caper or parsley sauce, boiled carrots and mashed potatoes, makes a change to the usual roast.

For the roasting meat, the oven should be hot enough to sear the outside quickly to retain all juices. For searing, allow from 20 to 30 minutes, depending on the size of the roast, and then lower the heat of the oven and allow about 20 minutes per pound for cooking.

If using a cover, no basting is required; without a cover, baste with hot dripping two or three times during the cooking. For roasting larger joints, steel skewers thrust through the meat are useful in helping the heat to penetrate to the centre. For frying, very little fat is required, and it should be made very hot before placing in the meat. It is better to use a knife or egg slice for turning meat when frying or braising, a fork allows the juices to escape. Braising and casserole are favourite ways of cooking the tender cuts.

The neck may be jointed and placed in the saucepan with onions, carrots and parsnips and covered with water, brought to the boil and let simmer until cooked. Add dumplings well-seasoned with pepper, salt and parsley. This makes a delicious stew for a cold day.

Flap can be used for mock tripe by cutting into pieces about an inch square, put in the saucepan with enough water to cover and simmer until tender; put aside to cool, then take off fat, add enough milk to cover meat, and thicken with flour, well seasoned with pepper and salt. Before serving, add a cup of chopped parsley. Mutton is the only meat that one does not tire of quickly, as one does of other meats such as pork or beef.

JOURNAL
OF THE
Department of Agriculture
OF
South Australia

VOL. XL. MAY, 1937. No. 10.

Published Monthly by the Department of Agriculture **Edited by H. C. PRITCHARD**

	Page
Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836-1936	769-775
Top-Dressing of Pasture Land	776-778
Some Factors Affecting the Germination and Growth of Herbage Plants in South Australia	779-786
Barley Diseases in South Australia and their Control	787-792
Export of Eggs and Egg Pulp—July-December	792
New Land Development in our Better Rainfall Areas	793-794
Papers Read at Conferences	798-804
Advisory Board	804
Rainfall Table	805-806
Bureau Reports	807-813

WOMEN'S BRANCHES.

Bureau Reports	813-826

All communications to be addressed:
"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK T
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1937

River Murray, at Waikerie, Thursday, 17th June (Mr. F. B. Harden).

Eyre's Peninsula (West), at Ceduna, Wednesday, 7th July (Mr. E. Schwarz, Maltee).

Pruning Competitions, River Murray.—Mypolonga (date to be fixed); Cadell, 23rd June; Waikerie, 24th June; Moorook, 25th June; Berri, 29th June; Barmera, 30th June; championship at Waikerie, 1st July.

Upper North, at Booleroo Centre, Wednesday, 21st July (Mr. C. J. Carey and Miss V. Keller).

Pinnaroo Line, at Lameroo, Tuesday, 3rd August (Mr. J. L. Byrne).

Murray Lands West, at Karoonda, Thursday, 5th August (Mr. W. R. Trestrail, Coomandook).

Southern, at Milang, Thursday, 19th August (Mr. L. E. Yelland and Miss Ruth Whitfield).

Murray Lands East, at Taplan, Tuesday, 28th September (Mr. G. R. Hodge and Mrs. Hodge).

Eyre's Peninsula (East), at Cowell, Monday, 18th October (Mr. S. D. Ramsey, Cowell), Miltalie Branch.

Eyre's Peninsula (Lower), at Ungarra, Wednesday, 20th October (Mr. W. G. Gordon).

Eyre's Peninsula (Central), at Poochera, Friday, 22nd October (Mr. F. R. Joy).

Fruit Districts, at McLaren Flat, Tuesday, 2nd November (Mr. W. H. Kyloh).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

	London Values.					
Date of Quotation.	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	
1937.	May. *s. d.*	May. *s. d.*	April-May. *s. d.*	May-June. *s. d.*	June-July. *s. d.*	Various Sales.
April 22..	5 10½	5 9⅜	6 0⅜	6 3⅜	5 8¼	Western Australia—Parcel, 500 tons (April), at 5s. 10½d.
April 29..	5 7⅞	5 7⅛	5 9	6 0⅜	5 6⅞	Victoria—400 tons (May), shipment at 5s. 7⅛d. South Australia—3,000 tons (afloat), at 5s. 6⅜d.
	June.	June.	May.			
May 6..	5 10⅛	5 9⅜	5 11⅛	6 1¼	5 8¼	New South Wales—400 tons (April) shipment at 5s. 9¾d. to 5s. 10d.
May 13..	5 9	5 9	5 8⅝	6 0⅜	5 8¼	

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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By Arthur J. Perkins, Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 692.)

THE FIRST DECADE, 1836-1846.

CHAPTER IV.—continued.

The delays to Rural settlement did not apply to the livestock industry—The "Squatters"—Regulations concerning Pastoral settlement ignored for six years—Governor Grey's address on the subject—Overseas importation of livestock and losses therefrom —Joseph Hawdon's pioneer overland journey to South Australia with a herd of cattle.

Joseph Hawdon was a comparatively newcomer to Australia at the time, having reached Sydney in November, 1834, at the instance of his brother, John Hawdon, of Burgalia, who owned important pastoral properties in New South Wales. Joseph Hawdon stated in his journal that towards the end of 1837 he "determined on making the arduous experiment of driving cattle, for the first time since the colonisation of New Holland, from eastern to Southern Australia; an undertaking which for a private individual, relying upon his own resources, was generally considered rash and quixotic." The expenses of the journey were to be borne equally between the two brothers. He took with him nine servants, whom he paid at the high rate of 20s. per week. He described their respective duties as followed:—"Four of them were to drive the cattle, 340 head in number; two to drive the drays; one to have charge of the horses; one to cook; and one to act as my bodyservant, having the care of my tent and its appurtenances. Each man was armed with a carabine, a pair of pistols, and a bayonet."

Joseph Hawdon left his New South Wales cattle station, near Western Port, for Melbourne on the 1st January, 1838: from thence he proceeded *via* the Goulbourn River to the station of Bonney and Burton, 36 miles north of Melbourne. He there arranged with Bonney to accompany him on the journey to Adelaide. On the 7th January his cattle station on the Hume River was reached: and on the 13th, after selecting the cattle for the expedition, "we with some difficulty and at no small risk of losing the greater part of them" (cattle) "made them swim across the river and got them all safely over. I then commenced my return to the River Goulbourn, the point at which I had agreed with Mr. Bonney to meet him with the drays." On 15th January the heat was intense, and aggravated by a violent northerly gale. By noon the cattle refused to move, one that was too fat dropping down dead. Subsequently a violent thunderstorm developed, during the course of which three bullocks were killed: three others which had been struck down by lightning were saved by copious bleeding. On the 17th Bonney joined the party with 1,200 sheep. "The cattle and the sheep crossed the river Goulbourn by swimming; the team of eight bullocks also swam across dragging the dray behind them, the driver swimming his horse alongside, performing his difficult task with admirable dexterity."

Joseph Hawdon.

[*Plate* 32.]

On the morning of the 22nd January "I commenced the most serious part of our journey, entering upon entirely new country, hitherto untrodden by the foot of civilised man. . . . . At 8 o'clock the van of my party headed by Mr. Bonney moved off in rude procession: first went the light dray drawn by six bullocks; then the heavy dray drawn by eight bullocks, laden with nearly 2 tons of stores: each team had a driver, with the first of whom walked the cook, and with the second the servant of my tent: behind the drays went a man driving a few sheep for our supplies of fresh mutton: then came the whole herd of cattle, driven by four horsemen, each rider having a spare horse: and last of all followed the dogs. When this party had disappeared among the trees, I dispatched three men with a dray and 1,200 sheep for Port Phillip; and another man with a horse and cart to wend his solitary way back to his station on the Hume, distant 115 miles, armed with a musket and accompanied only by a bulldog."

Between January 22nd and 31st the days seemed to have sped by uneventually enough. Kangaroos and emus were numerous and occasionally hunted, but apparently quite fruitlessly: the cods of the river on the other hand were less lucky, as on the evening of the 26th sufficient were "caught with hooks and line . . . . as would have supplied a hearty meal for four or five times our number.'' There were also occasional encounters with natives, all of whom proved either friendly, or else too timid to come within reach of the party. A working bullock was unfortunately drowned on the 29th: ''it appeared that being devoured with thirst the brutes rushed into the river before the men had time to unyoke them; and two of our men had a narrow escape of their lives whilst trying to disentangle them.''

On 29th January a sugar-loaf hill was sighted in the distance, which turned out to be the ''Mount Hope'' of Major Mitchell ''seen by him on his way to Cape Northumberland in the year 1836.'' At this stage the party ran out of grass for the travelling stock, which was hardly surprising considering the time of the year, but, according to Hawdon, the ''reeds'' along the river and swamps answered every purpose, and supplied the best type of food for travelling cattle.

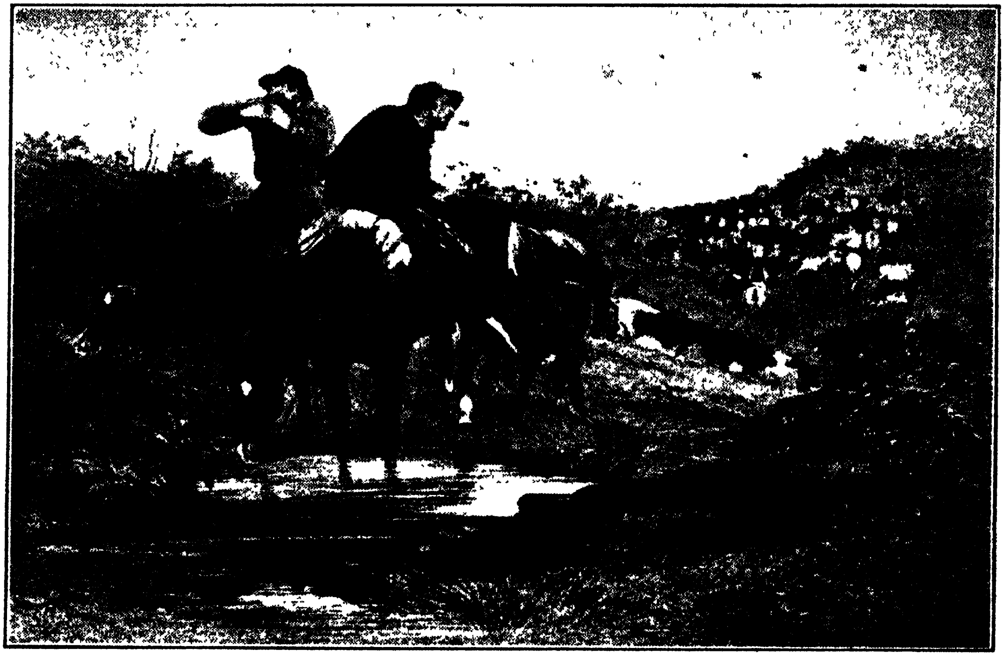
On 2nd February the party came upon the last encampment of Major Mitchell before he turned to the south: ''the weather must have been very wet, every impression left on the ground being still distinct.'' At this stage Hawdon determined to proceed southwards towards the river Yarane, the course of which had been shown by Major Mitchell in his report to Governor Bourke to take a westerly direction. Hawdon's reasons for this decision were:—(1) The danger of watering livestock at so large a river as the Hume; (2) the reputed hostility of the natives of the Murray; and (3) his belief that the Yarane might prove to be a branch of the Lindsay of Captain Sturt, which the latter had observed entering the Murray. Accordingly, on 3rd February, the party started across the dry plain towards the Yarane: the journey proved very trying to the livestock, and particularly so to the working bullocks, chiefly because of high temperatures and complete absence of water. The Yarane was reached on the 4th, but proved a complete disappointment: instead of a westerly direction it was found to take a north-westerly one, with the inference that it must inevitably discharge into the Hume. Moreover, there was no feed on its banks, and no water in its bed, except at intervals of seven to 10 miles. The party was therefore compelled to follow the course of the Yarane back to the Hume.

On 9th February ''the native dogs which had been howling around us all night, this morning drove the sheep out of their fold into a thick bush on the opposite side of the creek. The whole of my party were employed throughout the day searching for them; but although for six miles around not an emu or a kangaroo escaped our eyes, we could find no traces of the sheep except in two places, where we could perceive that they had been pursued by warrigals. I afterwards found on my return from this expedition that these sheep had travelled back over the whole country we had passed and arrived safely at Mr. Clarke's, the point from whence I took my departure on the Goulburn River.''

On the following day the party encamped on the banks of a branch of the Hume: and the day following again ''under a small hill . . . . covered on its side with clumps of pine: that was the 'Swan Hill' of Major Mitchell.'' At this stage rather more truculently inclined natives were met with, but commonsense, tact and patience on the part of Hawdon and his party prevented any actually hostile outbreak.

On 15th February the party encamped ''a mile below the junction of the Murrumbidgee with the river Hume. From this junction the river is called by Captain Sturt the Murray, until it empties itself into the Lake Alexandrina. Where the two rivers join and form the Murray, the Murrumbidgee is not one-third the size of the Hume: after the junction the Murray is not above 130yds. wide, though in the currents 7ft. deep, which in this dry season is rather great, but it appears from the water-mark to be sometimes 12ft. deeper. In the evening about forty-three blacks came up to my camp with an emu which they had just speared. Their usual method of killing this large bird is by climbing up a tree beneath which they know that the emu to be in the habit of coming, and when they have their prey immediately below them, they pierce him with a heavy spear about 12ft. long, kept for that purpose. Sometimes however, whilst the emu is drinking at the river they kill him with a light spear, which they discharge by throwing from a stick 3ft. in length; and having at the extremity a hook which slips into the end of the spear, both instruments being held in the right hand."

On 17th February a particularly hostile tribe of natives—about 150 in number—was encountered on the banks of the river. In the evening they deliberately set fire to a small patch of water grass, which Hawdon had selected for his live stock; and his men had to turn out under arms to extinguish the fire.



Overlanding with Cattle.

[*Plate* 33.] [*From sketch by S. T. Gill.*

On 21st February "whilst riding amongst the scrub in search of a pass for the drays, I alternately encountered in the confusion of the place, my own men and groups of natives. I was much amused in the course of the day with the simplicity of four or five blacks who were standing together whilst a number of the cattle were walking towards the spot they occupied, snorting as they cautiously drew nearer to their black observers. It is quite evident that the natives looked upon the oxen as rational beings for they gravely saluted them with their usual friendly exclamation of 'Bo, bo, marwood' (go on, go on, we are friendly), and waved green boughs at them in token of peace. The cattle not at all appreciating these marks of respect continued to move onward, when the poor fellows were obliged to run off, not daring to await the nearer approach of visitors so rude and unceremonious."

On 23rd February "I rode out five miles in a direct line from the river to a high white sandhill from the top of which I beheld as far as the eye could reach, in a southerly direction, one vast desert of sand, rendering this part of the country quite useless for the purpose of civilised life. Even on the flats of the river there is scarcely a blade of grass and very few reeds. Had our route lain much longer over such a region as this the working oxen must have perished from fatigue and famine."

On 28th February "a bank of sand stretching across the Murray I determined to cross over to the right bank of the river, making a course for the drays through the water by means of stakes. Having got all safely over we found a good supply of water grass and reeds, and halted for the day to refresh the cattle. Thus one of my greatest expected difficulties, that of getting the cattle over the River Murray has been surmounted without much trouble. I supposed the river was much larger at this point than I found it. On the following day we had travelled only three miles when we came upon the river Darling, just at the point where it joins the Murray. . . . . The cattle and drays now forded across the Darling, whilst one wheel of the dray was in the turbid water of the Darling the other was in the dark clear water of the river Murray, passing down the stream in this manner for about 300yds."

On the 5th March Hawdon discovered a hitherto unknown sheet of water which he named "Lake Victoria" in honour of the reigning Sovereign: on the 10th March he entered South Australian territory; and at the evening meal the health of Governor Hindmarsh was duly drunk with honours. On March 12th Hawdon discovered another sheet of water which he named "Lake Bonney" in honour of his travelling companion M. C. Bonney: he stated that the native name of this lake was "Nookamba".

On 19th March the party reached the north-west bend of the Murray, not far from the present site of Morgan. "In the afternoon we were cheered by the foot-prints of horses, the sight of which raised the spirits of the whole party. Taking two horsemen with me I followed the foot-prints to a place where it was plain there had been an encampment of Europeans. There was a mark of a man's shoe: some feathers that had been plucked off ducks; and the ground upon which horses had been tethered. After sleeping here we tracked the party, steering away from the river a west by south course; . . . . at sunset, we overtook Mr. Bonney encamped on the river, with about thirty blacks with him; one of whom, a very facetious fellow, described four horsemen who had been here a short while before, and who were the first Europeans they had seen. He made us understand, that while he was himself concealed amongst the reeds, he saw them strike a light with a lucifer match; that one of them smoked a cigar, and that another wore spectacles. I afterwards learned that there were four gentlemen from Adelaide who had been out in search of the Murray river."

On 21st March "a slight shower of rain fell, being the first we had had during nine weeks of travelling in a journey of one thousand miles."

On 29th March Hawdon ascended Mount Barker, from which he was able to see in the distance Lake Alexandrina: and on 1st April he encamped on the banks of the Onkaparinga.

On 2nd April "after going about five miles on descending the open grassy ranges towards the sea, our course was arrested by their nearly perpendicular termination. Mr. Bonney and I rode in separate directions to look for the pass; he going to the south, while I accompanied by Henry Benson went north. On coming to the seashore we observed the fresh print of a horse's hoof, and following the track thus obtained we came upon a tent and hut, in which were residing three young men, who were first commencing a settler's life: their chief occupation at the time was the hunting of kangaroos for the Adelaide market, which they disposed of at 1s. per lb. On my first appearing before them they were at a loss what to make of me: but on telling them that I had come across the vast wilderness of the interior, they showed me every possible attention and hospitality. After dinner I despatched Harry to Mr. Bonney, and the tent and live stock were forthwith brought into this place being just 15 miles south of Adelaide."

On the following day "it was nearly evening before I started on horseback for Adelaide, one of the young hunters kindly going with me as a guide. About an hour after dark I entered that infant metropolis and enjoyed a most hearty welcome at . . . . hotel, when I once more enjoyed the bustle of civilised life."

On 4th April "I dined and spent a pleasant evening with His Excellency Governor Hindmarsh, who expressed himself delighted at my arrival, and with the advantages which my arrival with stock would both immediately and in its future consequences, entail upon the new colony." (11)

A public dinner was subsequently given to Joseph Hawdon at Shepherds Hotel, for which an ox chosen from his own herd was roasted whole. The Hon. J. H. Fisher presided, and in proposing the toast of the guest for the evening said that much as he felt disposed to trespass on the indulgence of the company, he would content himself with saying that the benefit conferred on the colony by the arduous but successful enterprise of Mr. Hawdon in connecting New South Wales with South Australia, would hand down his name with honour to posterity. In fact, the first stage of the grand transit of stock which sooner or later would unite the eastern and western shores of this great continent was now established. South Australia would thereafter form the principal link in the great chain of continuous settlement along the southern coast, the establishment of which at no distant period seemed not only reasonable but certain. He would not however procrastinate the pleasure of hearing Mr. Hawdon's account of his journey, and his impressions on arrival in the colony, by any further observations of his own, begging him to accept as a tribute of respect and gratitude from the people of South Australia a snuff box, whose inscription would remind him that when he left their shores, he left many friends who were most anxious to see him settled in the midst of his flocks and herds under the expanding banner of South Australia.

Mr. Hawdon subsequently said in reply that he felt most grateful for the distinguished honour that day conferred upon him by the hospitable colonists of South Australia: and that he could not but congratulate himself upon the good fortune which had placed him in the character of the "First Traverser" with stock over the ranges of country lying between the point of his departure from New South Wales and Adelaide. He was happy to state that his progress was in no way charged with those dificulties he had apprehended and was prepared to grapple with: and with the exception of the sterile and barren tract of country immediately beyond the boundaries of South Australia, he had invariably met excellent land—more especially in the great valley of the Murray, where thousands of acres of most fertile alluvial land invited the settler. The character of the country embraced between the Murray, Lake Alexandrina, and Adelaide, was equal to anything that he had seen: he could not give a better pledge of his sincerity in making that declaration, than by publicly announcing at that time his intention of returning to settle among them, with all the force he could gather. It had been asserted—upon what ground he did not know—that the difficulties attending the migration of sheep from New South Wales to that colony were insurmountable: nay, that it was the project of a mere visionary. He begged leave to say that he apprehended little or no difficulty in the transit; and he pledged himself to prove, by actual experiment, the facility with which sheep might be introduced by land into that colony. His impression was that South Australia with her natural advantages of excellent arable soil, plenty of water, secure harborage, and fine geographical position, with Adelaide as her capital, would soon vie in point of importance with her elder sisters: more especially when the novel and excellent principles upon which that interesting colony was founded were better understood: and it was evident in the tone of society, in conjuction with the many other solid recommendations she possessed, and that too of the most respectable and useful character. He again offered his heartfelt acknowledgment for the honour they had done him, and begged that he might be permitted to give them—PROSPERITY IN SOUTH AUSTRALIA (¹²)

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(11) Journal of a Journey from New South Wales to Adelaide performed in 1838 by Joseph Hawdon (original in South Australian Archives).

And thus, shall we say, came to a triumphant close the drama of the pioneer overland migration of cattle into South Australia, notwithstanding the assertion of a sleepy reporter that, "the hilarity of the evening continued until the cock crew". Nor on reflection can we deny to Joseph Hawdon his full mead of praise: notwithstanding his apparent insincerity, since neither of his pledges was ever redeemed: he never returned to South Australia "with all the force he could gather;" nor did he pioneer the overland migration of sheep into South Australia: notwithstanding his obvious desire to please his hearers when he placed a quite exaggerated value on the fertility of the soil of the valley of the Murray, and his mistaken praise of the "novel but excellent principles" upon which the colony had been founded. On the whole by comparison these were but trifling shortcomings—of the heart rather than the head—which could do but little to obscure the merits of the achievement of the First Overlander in opening the way to success in the South Australian pastoral industry.

(¹²) *The Southern Australian*, 9th June, 1838, page 3, col. 4.

(*To be continued.*)

Dressings for Blowfly Strike in Sheep.

The following replies to questions submitted at the Coonawarra Conference were given by Mr. Alan H. Robin, B.V.Sc., Government Veterinary Officer:—

Calcium Arsenite Mixture.—For jetting sheep for protection against blowfly strike. This may be made as follows:—(Vide *Ag. Gazette*, N.S.W., Oct., 1935). Boil 4lbs. of white Arsenic and 8oz. of Caustic Soda in 2galls. of water in a petrol tin, until the Arsenic is apparently dissolved. In slightly less than 2galls. of hot water in another petrol tin, slake 4lbs. of fresh stone lime, putting in 1lb. of lime or less at a time and stirring the water as slaking takes place. Pour the hot milk of lime slowly into the Arsenic solution, which should be kept boiling quietly beside the fire. If the lime is added too rapidly, the mixture will boil over. Keep boiling gently for a further 20 minutes. The petrol tin now contains white calcium arsenite in a weak caustic soda solution. The tinful is diluted with water to make up to 40galls. for use in jetting.

In making up this mixture, only hard lumps of stone lime fresh from the burners should be used.

It must be remembered that the calcium arsenite in this mixture is in the form of minute particles in suspension, and that these particles will settle out of suspension unless the mixture is kept thoroughly agitated during jetting operations.

Glyceroboric Mixture (For swabbing heads of rams for prevention of blowfly strike and for dressing struck sheep). To prepare (vide *C.S.I.R.*, *Journal*, August, 1935). Mix 3lbs. of powdered Boric Acid into 13lbs. (1gall.) of Glycerine. This forms a thick paste which is then heated gently and stirred constantly during heating, until all the Boric Acid is dissolved. The mixture is then cooled and stored. It must not be diluted with water and should be kept in air-tight bottles or tins, because the Boric Acid tends to separate out on exposure. Use only pure Glycerine as ordinary soap-crude Glycerine is unsuitable for the preparation for this dressing.

The effect of Top-dressing is seen on the plot on the right.

Top-Dressing Pasture Land

[Resumé of a wireless broadcast statement through 5CL by R. C. SCOTT, Chief Agricultural Adviser.]

Phosphorus is the one plant food that is universally lacking in South Australian soils and consequently the manuring of pastures in this State consists almost invariably of the application of phosphatic fertiliser, and in this connection superphosphate is the cheapest and most convenient form.

In some cases, where new pastures are being established, the land may be deficient in nitrogen but, as a rule, the addition of nitrogenous fertilisers is not an economic proposition and the shortage of this plant food is best made good by the application of sufficient superphosphate to ensure a strong growth of leguminous plants, and in this way build up supplies of organic nitrogen in the soil. Consequently, in South Australia, it can be accepted that top-dressing means the application of superphosphate to pasture land. The area top-dressed in this State is increasing year by year, and over the past five seasons has improved from 139,328 acres in 1931-32 to 535,990 acres in 1935-36.

On the other hand, the amount of superphosphate applied per acre has not altered to any extent and totalled 112lbs. in 1931 comparatively with 113lbs. at the present time. The heaviest average application takes place in the Adelaide Hills area where the mean figure is 124lbs. per acre, whilst in the South-East the average dressing is only 100lbs. of superphosphate to the acre. There is not the slightest doubt that these quantities can be profitably increased and a comparison with the dressings applied to pasture land in New Zealand is of interest.

In that country two million acres are top-dressed with superphosphate annually, the average application being 264lbs. per acre. The quantities applied vary from 1cwt. to 2cwt. every second or third year to as high as 7cwt. to 9cwt. per acre every season, whilst for the high producing districts a fair average is about 3cwt. per annum. Therefore, in the management of pastures in South Australia we have some distance to go before we approach the quantities regularly applied in the Dominion, and, in order to demonstrate the benefits of heavier applications, the South Australian Committee of the Australian Dairy Produce Board last year made available a quantity of superphosphate for use by selected dairymen in this State.

Applications were invited from those who proposed top-dressing their pastures during the coming season, the idea being that the Committee should provide sufficient superphosphate to make up the quantity for certain fields to that which was considered adequate for the particular conditions. That is to say, in most of the subterranean clover-rye grass pastures of the Adelaide Hills and South-Eastern districts where the farmer intended applying, say, 1cwt. to 1¼cwt. to the acre, the Committee would provide a further 1cwt. or ¾cwt. of superphosphate as the case may be, to make the total dressing for the experimental field up to 2cwt. to the acre.

On the other hand, with the reclaimed swamp lands or other high producing areas, the total manuring was raised to 3cwt. per acre, half being applied in the autumn and half in the spring, whilst in some of the lower rainfall areas the full amount was reduced to 1½cwt. to the acre.

Ultimately, top-dressing demonstrations were conducted on 90 properties situated in different districts of the State, and 32 tons of superphosphate distributed.

Generally speaking, the results recorded were most satisfactory. In practically every instance the landowner was satisfied that the increased pasture resulting from the heavier top-dressing had more than paid the cost of the additional fertiliser, and even up to 300 per cent. increase in produce was claimed. However, this is probably an over-estimation, and about 75 per cent. improvement appeared to be the general average. Exceptions where substantial increases did not occur took place when the plots were situated in the dryer areas. In such instances the rainfall was the limiting factor, and plants were unable to make full response to the fertiliser available. However, in the wetter districts sown pastures responded well, and at Meadows where a farmer had previously been using 90lbs. of superphosphate per acre, his report at the end of the season, after applying 2cwt. to the acre on the experimental field, was:—"I am so convinced as to the value of the extra super. that I intend to apply the same amount, if not more, in future years." Many other reports of a similar nature were received, and several men stated that the profit resulting from heavy manurial dressings was so clearly demonstrated that they intended applying more over the whole of their farms in the coming season.

Another notable effect of full top-dressing was the stronger growth promoted early in the season resulting in the provision of pasture at a period of the year when it was most valuable. Further, the feed remained green until later in the season, whilst many experimenters reported that their cows milked better and young stock maintained their condition better on the adequately manured fields

The practice of dividing the dressing and making two applications, namely autumn and spring, apeared to spread the growth of the pasture over the season. In this way the yield of meadow hay and subterranean clover seed crops was improved, but in view of New Zealand experience, it is doubtful if it leads to the production of a greater bulk of fodder.

As the result of careful experimental work in the Dominion, it has been shown that so far as total yield of fodder is concerned there is little advantage in dividing the quantity and making two or three applications during the year. On the other hand, applications made just prior to periods of low production are of advantage in spreading the pasture return. Therefore, after consideration of the extra cost of applying it, it is doubtful whether two dressings are payable, although they may be so for hay or seed crops.

The results obtained are not new and the benefits of phosphatic applications are widely recognised but at the same time it is necessary to emphasise the fact that heavier applications than those commonly applied to-day are a payable proposition.

These 90 top-dressed trials have filled a useful purpose in as much as they have demonstrated the value of adequate phosphatic applications on a practical scale. They have enabled the farmer to compare the effect of light and heavy dressings on his own property, and in most cases the results have convinced both him, and others who have interested themselves in the work, that the amount previously applied can be economically increased.

At the same time the quantity of additional pasture has not been measured, and therefore the results of top-dressing experiments at the Kybybolite Experiment Station where the trials are carefully carried out and the returns calculated are of value. At this station a subterranean clover-Wimmera Rye Grass field, annually dressed with 180lbs. of 45 grade superphosphate per acre, has, over a 9 year period, carried 5.35 sheep per acre per annum. Another paddock, similarly planted, but not receiving any top-dressing, has only provided sufficient feed for 1.05 sheep. When 45lbs. of superphosphate are regularly added the grazing goes up to 3.36 sheep and 4.74 sheep per acre per annum following a dressing of 90lbs. Consequently, at Kybobolite, where the annual rainfall is 21½in., the heaviest dressing in the trials, namely 180lbs. per acre, has returned the greatest profit, and it is certain that where the rainfall is greater or where irrigation water is available, this amount can be economically increased.

A tremendous improvement in production follows the application of relatively small amounts of superphosphate, but all the work done clearly indicates that dressings heavier than the average for the State, namely 113lbs. per acre, are distinctly payable. This quantity can be at least doubled in our sown pasture areas of the South-East and Adelaide Hills, that is to say, amounting to about 2cwt. to the acre and increasing to about 3cwt. for the higher producing flats and swamp lands of the State.

At the present time superphosphate is not expensive, whilst an added inducement for heavier dressings this year is the Commonwealth Bounty of 10s. per ton.

Finally it is desired particularly to stress the fact that, apart altogether from the health of livestock, all pasture lands must be top-dressed for full production of grass and, generally speaking, at least 2cwt. per acre is a payable proposition. Consequently, wherever finances permit, this quantity should be added each year to subterranean clover-rye grass land in South Australia.

Tailing and Docking Lambs.

Mr. R. H. F. Macindoe, M.R.C.V.S., B.V.Sc. (Deputy Chief Inspector of Stock), has advised a Naracoorte subscriber to the *Journal of Agriculture*, who asked for information regarding the docking of lambs with the searing iron that this method of tailing lambs is not recommended, as it was proved years ago that the searing iron caused more pain, slower healing, and mortality due to bacterial infection at the site of amputation. To-day, the searing iron is out of date, and the knife is the best instrument. When "marking" the lambs, the following precautions should be taken:—

Muster the flock in a corner of a well grassed paddock and separate the lambs off from the ewes by running a temporary wirenetting fence across the corner. On a post place a clean piece of board covered with a piece of clean sheep skin, upon which the lamb is held ready for operation.

When tailing, press the skin back towards the butt of tail and cut through the second joint in the case of ewes, and third joint in the case of males.

Between operations, the knives should be kept in a disinfectant solution such as Lysol, 2 tablespoons in 1 pint of water.

A dressing of Lysol, 2 tablespoons to ½ pint of olive oil can be applied to the stump with a brush before releasing the lamb.

Never mark lambs in yards, owing to the danger of their contracting tetanus, through the operation wounds. Tetanus is a disease caused by a germ which abounds in manure and often causes a heavy mortality in lambs.

Some Factors Affecting the Germination and Growth of Herbage Plants in South Australia

[By H. C. TRUMBLE, M.Agr.Sc., Agronomist, Waite Agricultural Research Institute, University of Adelaide.]

The pastures of the agricultural areas in South Australia contain both native and exotic herbage plants. Although grasses of the *Danthonia, Stipa, Microlaena* and *Eragrostis* genera have, in the absence of top-dressing, dominated much cleared pastoral land in the earlier phases of settlement, they have been found in the main to disappear with agricultural development (18). The application of superphosphate, by stimulating competition from exotic species that are more highly aggressive under conditions of improved soil fertility, plays a conspicuous part in this change.

The exotic herbage plants now found in South Australia have gradually been introduced as impurities in seeds, associates of packing and fodder, &c., during the past century. In 1909, Black (1) classed 368 species as naturalised and forming the greater portion of the herbage near towns. Of these, 128 were said to have originated from Europe and Western Asia generally; there were 92 in addition specifically from the Mediterranean region, 44 from South Africa and 60 of a cosmopolitan nature. In this list (2) there are now 56 grasses, 32 pasture legumes of the Trifoleae and approximately 30 species of the Compositae, excluding noxious weeds. The natural pastures of the agricultural areas are composed mainly of ephemerals, and species of outstanding importance include the burr trefoils (*Medicago* spp.) annual clovers (*Trifolium* spp.), *Melilotus indica,* the barley grasses (*Hordeum murinum* and *H. maritimum*), silver grass (*Festuca myuros*), Wimmera rye-grass (*Lolium* spp.), wild oats (*Avena barbata* and *A. fatua*), the bromes (*Bromus hordeaceus, B. madritensis* and *B. villosus*), *Schismus barbatus,* cape weed (*Cryptostemma calendulaceum*) and the crowfoots (*Erodium* spp.).

During the last decade there has been a marked extension in the practice of seeding down pasture land with improved herbage species; and the main grasses and legumes used for this purpose are subterranean clover (*Trifolium subterraneum*), lucerne (*Medicago sativa*), Wimmera rye-grass, perennial rye-grass (*Lolium perenne*) and *Phalaris tuberosa.*

In view of the rapid extension of the naturally self-regenerating annuals by seed dispersal and the increasing utilisation of the cultivated species in practice, a knowledge of the properties of the more widespread herbage seeds, and particularly the relation of their seed germination to temperature should be available. During the course of the pasture investigations at the Waite Institute, numerous tests for seed viability have been carried out under varying conditions, and the germination of dominant species has been studied by means of a multiple temperature incubator. It is the purpose of this paper to place on record a summary of the results that have been obtained.

The Germination of Pasture Legumes.

Imperviousness of the seed coat has long been recognised as a predominant feature in legumes, and the literature on this question is extensive. Examples are provided by the work of Ewart (7) and of Crocker (6).

Hiltner (11) was the first to show that hard clover seeds swelled rapidly after treatment with concentrated sulphuric acid; he also found, in the case of cultivated legumes that crops ripening in dry periods showed a higher proportion of hard seeds than where ripening occurred under more humid conditions. Furthermore, Harrington (9) found that lucerne and clovers in general, grown under varying soil and climatic conditions tended to produce approximately 90 per cent. of hard seeds if hulled by hand, but usually less than 20 per cent. if hulled by machine.

These facts have a significant bearing on the question of legume development under South Australian conditions. Most of the legumes listed in Table I. tend to produce hard seeds in this environment, and the percentage of hard seeds increases with the aridity of the ripening period. The annual legumes, *Medicago denticulata, M. confinis, M. scutellata, M. tribuloides, Melilotus indica, Trifolium glomeratum, T. lappaceum* and *T. arvense*, have frequently been found to give 0-5 per cent. germination in hand-picked samples, which after treatment by acid or by scarification have subsequently given a high germination. Additional species, in which high percentages of hard seeds have occurred, are strawberry clover (*T. fragiferum*), drooping-flowered clover (*T. cernuum*) and subterranean clover. Dormancy and hard seeds have also been recorded for subterranean clover (10), (22), and drooping-flowered clover (13) in other parts of Australia.

The author collected, in November, 1933, some seeds of cluster clover (*T. glomeratum*) from within the mud walls of a house which had been erected between December, 1900, and March, 1901.* Straw had been used from clover that had ripened in November, 1900, so that the seeds were 33 years of age. When a sample of 50 seeds was placed on an incubator at 20° C. at the Waite Institute no germination occurred in 21 days. After drying and rubbing with glass paper, however, all seeds germinated in eight days. Other workers (5), (16), (20) have found seeds to remain viable in soil for longer periods.

In the laboratory, mechanical abrasion by fine emery or glass paper has proved the most satisfactory means of breaking down the seed coat, but treatment with concentrated sulphuric acid for 30 minutes followed by thorough washing has also been successfully employed. The results of multiple temperature incubator tests with a number of typical pasture legumes are given in Table I. The incubator used for this work comprises 14 contiguous compartments, each 4in. x 6in. x 8in., well insulated, but connected by three steel bars terminating in a hot water bath at one end and a refrigerator at the other. The temperature range obtainable varied with the time of the year; 1-38° C. was secured in winter and 7-41° C. in autumn or spring.

TABLE I.—*Range of Temperature, Temperature of Maximum Germination and Optimum Temperature for the Germination of Selected Pasture Legumes.*

	Range of Temperature.		Maximum Percentage Germinated.	Temperature at which Maximum Reached.		Optimum Temperature†.	Percentage Germinated at Optimum.	
	Lowest °C.	Highest °C.		Lowest °C.	Highest °C.	°C.	Two Days.	Five Days.
Lucerne (*Medicago sativa*)	4	34	92	9	27	24	89	92
Burr trefoil (*M. denticulata*)	6‡	23	98	6	14	14	83	96
Strawberry clover (*Trifolium fragiferum*)	7‡	41‡	61	7	26	24	50	58
Subterranean clover (*T. subterraneum*)	1‡	33	85	10	24	18	83	85
Cluster clover (*T. glomeratum*) ...	6	33	87	15		15	79	87
T. lappaceum	6	33	41	13	14	14	36	41

† Temperature of most rapid maximum germination. ‡ Highest, or lowest, temperature employed.

The two summer-growing perennials *Medicago sativa* and *Trifolium fragiferum*, germinated most actively at 24° C., whereas the winter annual species were characterised in all cases by lower optima, 14-18° C.

The Development of Legumes in Pastures.

At least three factors of importance govern the development of these legumes in South Australian pastures. Firstly, legumes are not vigorous in seasons characterised by a late commencement of the rainfall season, as in 1927 and 1930. The season commenced at the Waite Institute on 29th April and 11th May respectively in these two years, compared with a mean commencement date of 3rd April. Further evidence on this point is given in Table II., which shows the result of deferring seedings of subterranean clover and Wimmera rye-grass in the 1929 season. It will be observed that the yield of the clover is more strikingly depressed by deferred seeding than that of the grass. The conclusion is also backed by numerous field observations in other parts of the State.

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*The author is indebted to Mr. Stanley H. Sheridan, of Western River, Kangaroo Island, for these details.

TABLE II.—*Showing the Yield of Subterranean Clover and Wimmera Rye-Grass when Sown at Varying Dates,* 1929 *Season.* (*Commencement of Rainfall Season,* 23*rd April.*) *Yields in Lbs. Dry Herbage per Plot of* 1/320*th Acre. Means of duplicate Plots.*

	Date of Seeding.				
	13th May.	10th June.	26th June.	16th July.	9th August.
Wimmera rye-grass	31·7	27·1	28·2	12·2	6·1
Subterranean clover	16·0	11·2	10·6	2·5	0·6
Subterranean clover (with rye-grass as 100)	50	41	37	20	10

The significance of the early break is partially bound up with impermeability of the hard seeds and their low optimum temperature for germination. Early rains coincident with warm soil temperatures result in a partial breakdown of the seed coat due to biological or chemical action in the soil and the seed is rendered permeable at a time when soil temperatures favour rapid germination. The question of hard seeds does not appear to be as important in the case of subterranean clover as with the smaller natural clovers, particularly under the less arid spring conditions of the established subterranean clover areas, but even in these cases the early break definitely favours the development of the clover. It has been found (19) that yield in a clover increases materially with density of population; in a grass limited by nitrogen, this does not occur.

The second factor of importance is the level of available phosphate in the soil. In South Australia, all legumes are greatly dependent on phosphate dressings and the response of pasture to superphosphate presupposes the occurrence of leguminous herbage plants in sufficient quantity.

The third factor is the associated condition of high available soil nitrogen and aggressiveness from grasses and other nonlegumes.

Even where the early commencement of the rainfall season provides favourable climatic conditions and a liberal supply of phosphate is available, legume development may be poor due to suppression. The legumes are not highly aggressive species except under conditions of low nitrogen supply, and it has been repeatedly observed that as the level of available soil nitrogen is increased, either by cultivation, the application of nitrogenous fertilisers or legume development itself, pasture legumes inevitably tend to become reduced if not suppressed. At the Waite Institute, the seasons 1931 and 1933 were characterised by liberal early rains, yet plots that had received more than 10cwts. per acre of superphosphate over six seasons failed to produce a good growth of legumes (21). This was because legumes had grown vigorously in 1925, 1926, 1928, 1929 and 1932, resulting in material gains in nitrogen by the soil and domination by nitrogen-demanding species such as Salvation Jane (*Echium plantagineum*), crowfoot (*Erodium botrys*) and the various annual grasses.

The principal advances in pasture establishment in South Australia have been made by the use of subterranean clover of the Mount Barker type. More recently, the early-maturing Dwalganup strain has been seeded extensively under low rainfall conditions, but there is an interval of five weeks between the maturity of the two varieties, and there is scope for the use of the Seaton (S.A.) and Springhurst (Vict.) varieties, both of which are intermediate in earliness and yield.

In the case of the remaining annual legumes, their distribution is so widespread as a result of dispersal by livestock (*a*) externally, in wool, hoofs, &c., (*b*) internally, as hard seeds excreted with the faeces, that there is usually little necessity to sow them. In this connection, the work of Harmon and Keim (8) is of some interest. They found that certain seeds occurred uninjured in the faeces of various farm animals and that these gave a higher viability than similar seeds unfed. After treatment with sulphuric acid, however, the unfed seeds gave a higher viability than those recovered from the faeces.

The Germination of Pasture Grasses and other Non-Legumes.

Natural dormancy is a well-known phenomenon in the seeds of agricultural weeds and grasses. Examples are quoted by Crocker (*loc. cit.*) and Chippindale (4), whereas Meadly (13) has found delayed germination in the case of freshly harvested Wimmera rye-grass seed.

The self-regenerating annual grasses which occur in South Australian pastures usually germinate readily with the first seasonal rains, and no cases of dormancy have been observed in seed ripened at Adelaide. After-ripening has been found necessary in certain samples of *Phalaris tuberosa* (17), prairie grass (*Bromus unioloides*) and Waipu brown top (*Agrostis tenuis*), but these had been grown under cooler and more humid ripening conditions than obtain at the Waite Institute in early summer. Treatment with sulphuric acid (S.G. = 1.84) has proved effective in stimulating the germination of *Danthonia* spp., *Andropogon* spp. and *Astrebla* spp., as a result of a reduction in the obstructiveness of the flowering glume; similar treatment improved the germination of *Oryzopsis miliacea* and *Erodium botrys*, due to increased permeability of the seed coat. The common annual grasses such as the *Lolium* spp., *Hordeum* spp., *Festuca myuros, Bromus* spp., *Brachypodium distachyum* and the annual *Phalaris* species usually germinate readily under favourable conditions of moisture, temperature and aeration.

The relation between temperature and the germination of various non-legumes is shown in Table III. Summer-growing grasses are included for comparison.

Two factors of interest emerge from a consideration of Tables I. and III. Firstly, the cultivated pasture species—lucerne, strawberry clover, subterranean clover, the rye-grasses and *Phalaris tuberosa*—are all capable of attaining maximum germination over a comparatively wide range of temperature, 10-25° C. Non-cultivated species which behave similarly are *Brachypodium distachyum, Erodium botrys* and *Paspalidium jubiflorum*. The remaining species, including the cultivated summer grasses Hungarian millet and Sudan grass, attained maximum viability over a narrower range and were, in general, more dependent on incubation temperatures in the neighbourhood of the optimum value. The second factor of interest is the marked *difference* between the summer species and the winter species in regard to the optimum temperature range for germination. The former germinated most vigorously at temperatures of 22-38° C. (72-100° F.), whereas the winter-grown species, including both legumes and non-legumes, were characterised by the range 10-28° C. (50-82° F.).

Field Germination in Relation to Soil Temperatures.

The mean monthly soil temperatures at 1in., and the approximate theoretical temperatures at ½in. beneath the surface, for the period 1925-35, at the Waite Institute, are shown in Table IV.

Taking these means as a guide, the range 50-82° F. occurs over the period April to November inclusive, which is the period of effective rainfall at this centre. The range 72-100° F. for summer species occurs over the period October-November to March-April, which is for the most part the period of summer aridity.

TABLE III.—*Range of Temperature, Temperature of Maximum Germination and Optimum Temperature for the Germination of Selected Grasses and other Non-legumes.* (*Germination period,* 21 *days.*)

	Range of Temperature. Lowest °C.	Range of Temperature. Highest °C.	Maximum Percentage Germinated.	Temperature at which Maximum Reached. Lowest °C.	Temperature at which Maximum Reached. Highest °C.	Optimum Temperature.† °C.	Percentage Germinated at Optimum. Two Days.	Percentage Germinated at Optimum. Five Days.
1. Summer Grasses—								
Barnyard millet (*Echinochloa crus-galli*)	13	40*	96	38		38	75	92
Warrego grass (*Paspalidium jubiflorum*)	16	41*	68	22	36	35	52	68
Guinea grass (*Panicum maximum*)	12	36	76	22	25	25	23	72
Hungarian millet (*Setaria italica*)	12	41*	95	27		27	95	—
Sudan grass (*Sorghum sudanense*)	12	41*	98	30	35	35	94	98
Bull Mitchell grass (*Astrebla pectinata*)	12	41*	80	22	30	30	56	80
Mitchell grass (*A. lappacea*)	9	34*	30	25		25	13	29
		* Highest Temperature Employed.						
2. Cultivated Winter Grasses—								
Perennial rye-grass (*Lolium perenne*)	5	30	92	10	26	20	—	92
Wimmera rye-grass	7	32	92	10	24	20	—	92
Phalaris tuberosa	8	33	92	12	24	20	—	90
3. Non-Cultivated Grasses—								
Wallaby grass (*Danthonia semiannularis*)	9	33	97	18	20	18	—	12
Many-flowered millet (*Oryzopsis miliacea*)	9	27	89	17		17	—	21
False brome (*Brachypodium distachyum*)	7	34	100	10	24	24	58	99
Silver grass (*Festuca myuros*)	7	25	100	17		17	93	100
Bulbous blue grass (*Poa bulbosa*)	4	25	97	15		15	44	81
Kelch grass (*Schismus barbatus*)	7	29	79	14	21	20	58	79
4. Miscellaneous Species—								
Trailing saltbush (*Atriplex semibaccatum*)	5	32	73	24·5		16	(53% in 7 days)	
Crowfoot (*Erodium botrys*)	6	30	12	15	28	20	10	—
Salvation Jane (*Echium plantagineum*)	6‡	32	80	16·5		16	55	78
Plantain (*Plantago lanceolata*)	6‡	32	75	16	19	18	36	67
		‡ Lowest Temperature Employed.						

† Temperature of most rapid maximum germination.

TABLE IV.—*Mean Soil Temperatures* (° *F.*), *Waite Institute,* 1925-35.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
At one inch (actual)	89·0	87·5	82·7	71·0	62·1	57·9	55·3	57·4	63·2	70·2	79·9	86·4	71·8
At ½in. (approx. theoretical)	92	90	85	73	64	59	56	58	65	73	82	89	74

The optimum temperature of germination for lucerne and strawberry clover is in the neighbourhood of 24° C. (75° F.). This temperature is most usual in the months of April and October. The month of October is liable to moisture deficiency in South Australia, and sowings of these species, if not made in April, are best carried out in early September. At this time of the year there is usually sufficient moisture to ensure satisfactory germination, and as temperatures are rising, favourable temperature conditions are likely soon to occur.

Practical experience has shown that in areas receiving 18in. or more of mean annual rainfall, seedings of lucerne in late August or early September are more satisfactory than autumn sowings owing to the liability of the latter to damage from competition by lucerne flea and the growth of winter weeds.

The cultivated pasture grasses, Wimmera rye-grass, perennial rye-grass and *Phalaris tuberosa*, germinated most actively at approximately 20° C. (68° F.). Surface soil temperatures at this value are most common in late April to early May at the Waite Institute, which has been found by experience to be the most favourable period of seeding. In the higher rainfall districts, mean soil temperatures tend to be slightly lower throughout the year, and April seedings are indicated.

Subterranean clover germinates most actively at 18° C. (64° F.), which occurs most frequently in May at the Waite Institute, and in late April in the higher rainfall areas. This clover, however, is characterised by extraordinarily rapid germination over a wide temperature range, and seedlings are likely to appear in large numbers when moist conditions of the surface soil coincide with temperatures of 10-24° C. (50-75° F.) for only two or three days. Apart from tropical disturbances followed immediately by hot weather, occasional liberal summer rains may be associated with moderate temperatures and result in the rapid appearance of seedlings. These are subsequently lost in most cases, due to succeeding dry weather prior to the commencement of the actual season. The presence of seeds of varying degrees of hardness, the existence of physiological dormancy and of variations in the seeds to temperature response act as safeguards to the persistence of the species.

The natural clovers and trefoils such as cluster clover (*T. glomeratum*) and burr trefoil (*M. denticulata*) germinate most actively at approximately 15° C. (59° F.), which is characteristic of early winter at the Waite Institute. As pointed out previously, the factors of seed permeability, early commencement of seasonal rains, superphosphate application, and reduced non-legume competition associated with a low available soil nitrogen level, all affect the development of these legumes in pastures; and if a favourable combination of the above factors should occur, even the low proportion of the numerous seeds present that germinate at 70° F. will result in a reasonably dense population of seedlings, which subsequent germination at lower temperatures will further augment.

The Factor of Competition.

The competition factor is frequently a major determinant of the survival or otherwise of both non-legumes and legumes. In South Australian field experiments, the aggressiveness of the rye-grasses has been particularly evident whenever these grasses have been included in tests. Rapid seed germination, early development of a richly-branched root system and an extremely rapid growth rate, where nitrogen is not limiting, enable these species to attain a degree of early aggressiveness attained by few, if any, other herbage species under South Australian conditions. The importance of early and uniform development under both favourable and adverse conditions has been pointed out by Pavlychenko and Harrington (19), and this appears to be a major factor in determining the aggressiveness of the rye-grasses.

The part played by the root system in the suppression of *Phalaris tuberosa* by the shorter but more densely-branched *Lolium perenne* is shown by the work of Cashmore (3). Deeply-rooting species such as lucerne, stinkwort (*Inula graveolens*) and wire weed (*Polygonum aviculare*), as well as the poorly-branched native grasses, have all been found to be rigidly suppressed by dense seedings of rye-grass. Subterranean clover, and the annual species in general, with the exception of the more vigorous Wimmera rye-grass, are also suppressed; and this suppression may take the form either of an inhibition of germination due to a high partial pressure of carbon di-oxide in the germination medium (12) or of seedling suppression at too early a stage to be observed. The delayed seedling growth described by Chippindale (4), as distinct from delayed germination, occurs in *P. tuberosa*, *Dactylis glomerata* and other perennial grasses. The phenomenon appears to be associated more with the vigorous early development of a richly-branched superficial root system than with any shading effect. Many failures of pasture species in South Australia may be attributed to the inclusion of 5lbs. or more per acre of rye-grass, resulting in 10 or more established plants of this species per square foot.

Suppression by rye-grass is greatly dependent on the available nitrogen content of the soil medium. Evidence has been brought forward (21) to show that the effect of the addition of sulphate of ammonia in stimulating perennial rye-grass is associated with a reduction in associate species. It is largely because of this effect that nitrogenous fertilisers have failed to achieve a rôle in economic pasture husbandry in southern Australia and New Zealand. In all, or nearly all cases, the investigations have been carried out with pastures in which perennial rye-grass formed a prominent constitutent, and the failure of the fertiliser has been due to clover depression and consequent subsequent deterioration of the sward.

Summary.

1. The early development from seed of pasture legumes in South Australia is dependent on the factors of seed permeability, the early commencement of seasonal rains, superphosphate application and reduced competition from non-legumes, associated with a low available nitrogen content of the soil.

2. A range of six typical legumes germinated between 7° C. and 23° C. (45-73° F.). Lucerne germinated from 4-34° C. (39-93° F.), subterranean clover from 1-33° C. (34-91° F.) and burr trefoil from 6-23° C. (43-73° F.). Lucerne and strawberry clover germinated most actively at 24° C. (75° F.); the winter annual species were characterised by lower optima, 14-18° C. (57-64° F.).

3. The germination of typical winter grasses occurred most vigorously over the range 10-25° C. (50-77° F.). The rye-grasses and *Phalaris tuberosa* germinated over the approximate range 7-32° C. (45-90° F.), with an optimum temperature for germination of 20° C. (68° F.). Non-cultivated grasses and other non-legumes germinated over a comparable range, but the naturally occurring species in general attained maximum viability over a narrower range of temperature than the cultivated species.

4. There was a marked difference between summer species and winter species in regard to the optimum temperature range for germination. The former germinated most vigorously at temperatures of 22-38° C. (72-100° F.), whereas the winter-grown species, including both legumes and non-legumes, were characterised by the range 10-28° C. (50-82° F.).

5. The growth of summer species tends to be precluded by the coincidence of arid soil conditions with temperatures favourable for their germination and early growth; on the other hand, winter-grown species are able to germinate throughout the rainfall season. In the case of cultivated pasture species, maximum germination and most active early development are to be expected in April to early May or in September. Over the higher rainfall areas of the State, early autumn seedings are most suitable for subterranean clover, the rye-grasses and *Phalaris tuberosa;* September seedings, or extremely early autumn seedings appear to be preferable for lucerne and strawberry clover.

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Opossums and Mistletoe.

When considering a request received from a branch of the Agricultural Bureau a few months ago that an open season be declared during the winter months in 1937 for killing opossums on account of the damage they were doing orchards, a member of the Advisory Board of Agriculture stated that many people held the opinion that the destruction of opossums in the Adelaide Hills had resulted in the spread of mistletoe, which was killing blue gum trees in that distrct.

At a conference on Australian Fauna held in Melbourne in September last, references made to the spread of mistletoe in forests supported the above opinion. It was stated at this Conference that mistletoe was a very serious pest which was destroying the finest timber. It was spread by certain birds, but only in comparatively recent years had it obtained such a tremendous hold in large forest areas. It was reported that in one area, nearly every second tree was infested with mistletoe, and the trees were dying. The opossum was a controlling factor when the mistletoe was in a succulent juicy stage, and there were probably not a dozen opossums in the area referred to. Recommendations had been made that the matter of control from the point of view of the utility of the opossums should be investigated. It was considered fairly positive that the opossum assisted in keeping down the spread of mistletoe.

Barley Diseases in South Australia and their Control

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South Australia, with an average annual barley production of nearly five million bushels is easily the most important barley growing State in the Commonwealth.

About 90 per cent. of this production consist of two-rowed English malting barley, for the growth and harvesting of which the climatic conditions in the barley growing districts are generally very suitable. One factor affecting production and the appearance of the barley sample is the occurrence of diseases in the growing crop. Although these diseases rarely occur in such severe form that they cause heavy loss, the efficient control of the commoner ones is so simple and inexpensive that the necessary operations are thoroughly justified.

"Smuts," covered and loost, "leaf stripe," "rust," "takeall," "mildew" and "spot blotch" are the principal diseases present in this State. Of these the "smuts" are the best known. "Rust" is an air-borne disease which, in a warm moist spring may cause some damage in the later districts. "Takeall," on the other hand, is a soil-borne disease, attacking the roots of the plants in such a way as to impair their yielding capacity. This disease is fairly widespread, but its effect on barley is so much less than on wheat that its presence is not often observed. As a disease of barley it seldom gives cause for anxiety, though it should be remembered that a barley crop may conserve the disease in the soil for succeeding wheat crops which are planted on the same land.

"Mildew" and "spot blotch" are commonly present at some stage of the growing crop, but it is only under exceptional circumstances that they cause any economic loss.

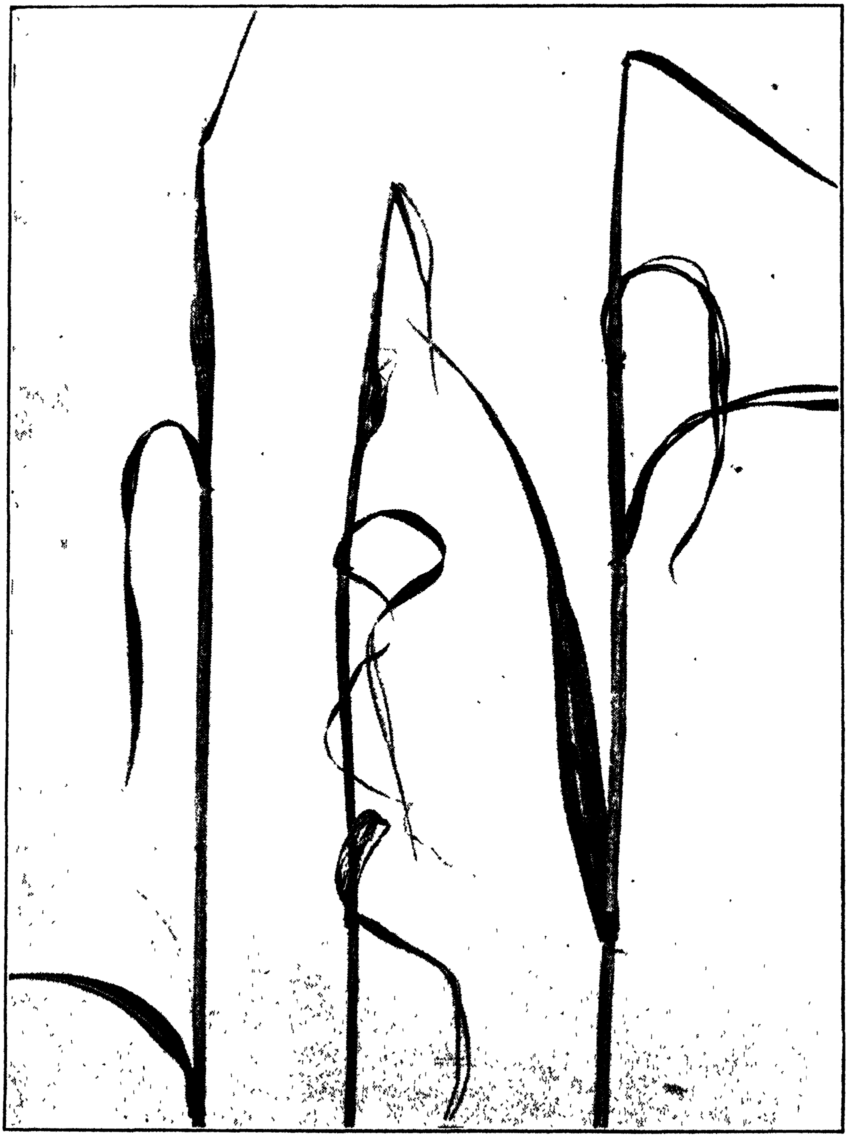
In this article further attention will be confined to "covered smut" and "stripe."

"Smut" does not require describing to barley growers, but it is necessary to point out that there are two distinct kinds of barley "smut." In "covered smut" (*Ustilago hordei*) which is the commoner kind, the black masses of spores, which have replaced the grain, stick firmly together and are only partially broken during harvesting. In an infected sample the black "smut balls" can easily be picked out. On the other hand in "loose smut" (*Uustilagó nuda*), the spores, as the name suggests, are much less firmly bound to one another, and are readily spread about by the wind. Although these two diseases as they occur in the field are not greatly different in appearance, their life histories are quite distinct, and the methods for their control are quite different.

The distinction already drawn between the two kinds of "smut" provides a clue to these different life histories. In "covered smut," the spores remain stuck together till at harvest a proportion are smashed and the spores thus set free cling to the outsides of healthy grain, where they are in a favourable position to germinate and attack the young seedling when it emerges soon after the grain is planted. It was this species of "smut" which was controlled in the experiments described below. On the other hand, in "loose smut" the spores are spread about as soon as the affected heads bearing them emerge from the sheath. At the same time the heads on the neighbouring healthy plants are in flower and these spores may fall on to these delicate developing parts. Should they do so, and weather conditions, at the same time, be favourable, the spores germinate and grow down into the grain. In spite of this infection the grain continues to fill normally, so that by harvest time it is indistinguishable from thoroughly healthy grain. When such a grain is planted and starts growing, the fungus which has been lying dormant within, resumes its activity, keeps pace with the growing point of the plant and eventually produces a "smutted" ear. Infection with "loose smut" is thus internal and control of the disease dependent on its destruction in that situation. Actually this can be done by any one of a number of hot-water treatments which eliminate "loose smut" infection from a sample, and only slightly reducing its germinating capacity. We are fortunate, however, in that seed samples containing much "loose smut" are quite rare. If trouble with this disease is encountered, probably all that is required is to obtain seed from a fresh source, rather than attempt to use the hot-water treatment, which, while efficient, is troublesome and difficult to manipulate.

"Leaf stripe" (*Helminthosporium gramineum*), though probably present in this State for some years, has only been identified quite recently. The discovery is probably to be associated with the more extensive cultivation of what is known as "Californian Cape," a six-rowed variety used for malting, because it is only in this variety that any substantial development of the disease has been observed.

"Stripe" may affect plants in all stages of growth, its characteristic feature, as the name suggests, consisting of the develop-



Leaf Stripe (*Helminthosporium gramineum*) on Californian Cape Barley.

ment of long narrow brown stripes on otherwise green leaves and leaf sheaths. On these stripes, which later dry and split, giving the plant a ragged look, myriads of spores are produced. These spores may promote secondary infections on other leaves or become lodged upon the healthy grain of neighbouring plants. By thus contaminating seed samples they constitute an important means by which the disease carries over from year to year. The plants having striped leaves often fail to come into ear, but where they do, the ear may scarcely emerge from the sheath, producing little or no grain (see plate). "Stripe" first starts as the result of an infection of the plant soon after the germination of contaminated seed. This first infection of the seedling persists and serves to infect each new leaf prior to its unfolding till it finally reaches the head whose emergence it may prevent. Although secondary infections may develop from spores produced from the striped areas, such infections have no appreciable effect on yield. It is the early infections arising from contaminated seed which are economically important.

Experimental Work on the Control of "Covered Smut" (*Ustilago Hordei.*)

1935 EXPERIMENT.

Method.—The following treatments were tested:—

(*a*) No treatment.

(*b*) Formalin (1-320) sprinkled on seeds spread on floor covered overnight and sown next day.

(*c*) Ceresan (U.T. 1875A) 1½ozs. per bushel.

(*d*) Agrosan G 2½ozs. per bushel.

(*e*) Copper carbonate 2ozs. per bushel.

(*f*) Formalin (1-400) seed soaked 30 minutes dried overnight and sown next day.

Plots.—36 plots, each 1/45 acre, arranged in 6 x 6 Latin square.

Seed.—Used naturally badly smutted seed (Pryor) which was further contaminated with as much dry powdered smut spore material as the seed would carry.

Planting.—Planted on land ploughed, cultivated, &c., after barley stubble, sown 26th July with drill at rate equivalent to 70lb. per acre, any balance after drilling being broadcast to give equal quantities of dry seed per plot.

Results.—The effects of the above-mentioned treatments on germinative capacity were tested under both laboratory and field conditions in separate experiments with adequate replication and revealed no significant differences as the result of treatment. The mean germination in the seed incubator was 99.5 per cent. and in rod-rows in the field 96 per cent. The results summarised in Table I. below for "covered smut" were derived from the examination of twelve separate systematically scattered foot samples from each plot.

TABLE I.—*"Covered Smut" Experiment*, 1935.

	A.	B.	C.	D.	E.	F.
	Control.	Formalin Sprinkled.	Ceresan.	Agrosan G.	Copper Carbonate.	Formalin Soaked.
Smutted plants per 100 plants	5·8	2·1	0	0	1·2	0·2
Yield in bushels per acre	21·1	23·5	19·8	22·5	16·6	22·7
Establishment at six weeks, plants per foot.	5·71	6·27	5·60	6·04	4·24	6·72

Difference for significance * (Standard error × 3)
" Smut "................ 1·5
Yield (bush. per acre)..... 3·9
Establishment .... 1·47

Comments.—Although the percentage "smut" was not as high as one would wish in an experiment of this type it is clear that all the treatments reduced to a significant degree the amount of smut present.

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* The term "Difference for Significance" refers to a figure derived from a statistical analysis of the data obtained from all plots. When the difference between two means exceeds this figure and certain other tests are satisfied it is safe to conclude that the treatments so considered have had a real effect on the quantity being measured.

It is worth noting that no "covered smut" occurred in the samples taken from the Ceresan and Agrosan plots.

With regard to yield the only noteworthy feature was a decided lowering with "copper carbonate" treatment, a reduction which could be correlated with the numbers of plants per foot length at six weeks. The reason for this reduction was not clear, but it was probably associated with bad conditions under which the plots were sown and with a prolonged wet spell to which they were subject after planting. The reduction was considered to be merely a seasonal effect.

1936 EXPERIMENT.

In this experiment the individual plots were very much smaller than those of 1935, but more numerous.

The following treatments were tested:—

(*a*) Ceresan (U.T. 1875A), 1½ozs. per bushel.
(*b*) Ceresan (U.T. 1875A), 3ozs. per bushel.
(*c*) Agrosan 13536, 1.18ozs. per bushel.
(*d*) Copper carbonate, 2ozs. per bushel.
(*e*) Formalin 1-320, sprinkled on seed stored overnight and sown next day.
(*f*) Water—sprinkled as in (*e*).
(*g*) No treatment.

All dry treatments were given a day or two prior to planting. The odd quantity of Agrosan 13536 used arose from a desire to standardise the application of the two preparations on the basis of their mercury contents as revealed to us.

Plots.—280 plots, 4ft. x 3ft. 3in., each planted with 180 seeds; plots arranged in randomised blocks and replicated 10 times.

Seed.—Used 2 samples of Pryor, one of Chevalier, and one of Plumage Archer. The Pryor and Chevalier samples were naturally badly smutted. To these samples and the Plumage Archer a heavy dusting with excess of smut material was given. All samples received all treatments. The plots were planted by hand on 3rd and 6th July, 1936.

Information was obtained on germination, numbers of "smutted" plants and the yield of each plots. For this last purpose the plots were trimmed to a uniform area.

Results.—The mean rate of germination with all treatments was remarkably uniform, ranging between 81.3 per cent. and 84.5 per cent. Table II. below summarises the results regarding the effect of treatments on the "covered smut" present and the yield of plots.

TABLE II.

Treatments.	Ceresan 1½ozs. per Bush.	Ceresan 3ozs. per Bush.	Agrosan 1·18ozs. per Bush.	Copper Carb. 2ozs. per Bush.	Formalin (1-320).	Water Only Control.	No Treatment.
Total number smutted plants—							
Chevalier	0	0	0	5	1	43	19
Pryor No. 1	0	0	0	10	5	67	17
Pryor No. 2	0	0	0	2	4	23	8
Plumage Archer	0	0	0	1	1	11	5
Mean yield, bushels per acre—							
Chevalier	57·8	51·9	54·4	57·2	—	—	54·5
Pryor No. 1	56·5	54·8	52·5	58·8	—	—	52·8
Pryor No. 2	55·2	56·5	55·2	54·3	—	—	55·2

"Difference for significance" for yield = 6·9.

Comments.—Despite the use of heavily "smutted" seed from four distinct localities, the amount of smut infection in the untreated plots was again disappointingly small. The highest number given, viz., 67 in Pryor No. 1 "water only control" represents only 5.3 per cent. of all the plants of this variety having this treatment. Bearing this weakness in mind, and it seems to be a weakness common to most of the experimental work on the control of barley smut, it is evident that the organic mercurial dusts Ceresan (U.T. 1875A) and Agrosan 13536 provided very good control of "covered smut." Neither copper carbonate nor formalin as applied gave as satisfactory results as these two dusts. The figures for yield were secured to investigate the suggestion that some of these treatments have a beneficial effect which is reflected in yield. The data in Table II., however, show that none of the differences can be considered statistically significant.

Experiments on the Control of Barley "Stripe" (Helminthosporium Cramineum.)

This experiment was conducted in 1936, the size, treatments, arrangement and planting of the 70 plots being similar to those for the experiment with "covered smut."

Seed of "Californian Cape" from a crop known to be badly affected by "stripe" in 1935 was used without attempting its further inoculation.

The results of this experiment are summarised in Table III.

TABLE III.

Treatments.	Ceresan 1½ozs. per Bush.	Ceresan 3ozs. per Bush.	Agrosan 1·18ozs. per Bush.	Copper Carb. 2ozs. per Bush.	Formalin (1-320).	Water Only Control.	No Treatment.
Mean No. of heads per 100 plants	277	292	288	188	228	165	174
Mean yield (bush. per acre)	62·9	61·8	60·3	44·5	52·5	44·5	39·3

Difference for significance.		
	Nos. heads per 100 plants	25·98
	Yield (bushels per acre)	6·42

Comments.—The average germination ranged from 78.8 per cent. to 84 per cent. with different treatments but none of these differences could be regarded as due to the effects of treatments.

(Fisher's Z test not significant for treatment.)

The figures representing the mean number of heads per 100 plants for each treatment were considered the best available for expressing the economic effects of the disease on the plant. As was stated earlier, the primarily diseased plants, which are the ones whose number seed treatment could be expected to reduce, generally fail in ear production.

It was obvious too, from field observations, that the disease had a marked effect on yield and that the bulk of the variations in this quantity from plot to plot could safely be attributed to the relative control effected by the different seed treatments.

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The figures in Table III. demonstrate quite clearly that the organic mercurial dusts Ceresan (U.T. 1875A) and Agrosan 13536 control "stripe" effectively. Formalin (1.320) sprinkled on the seed and copper carbonate occupy an intermediate position partially controlling the disease, as compared with its development in the control.

The experiments were carried out at the Waite Institute, and we are indebted to Mr. Pike, Field Officer, for his assistance in the field work involved.

Messrs. Barrett Bros., Dalgety & Co., S.A. Farmers' Co-op. Union Ltd., and Mr. R. Hill, of the Department of Agriculture, kindly secured and supplied us with the seed used in the experiment whilst Messrs. Bayer Products Ltd. and Imperial Chemical Industries of Australia and New Zealand Ltd. through local agency supplied the mercurial seed dressings referred to in this report.

Summary.—The barley disease situation in South Australia is briefly reviewed, special attention being given to "loose" and "covered smut" and to barley "leaf stripe."

"Leaf stripe" (*Helminthosporium gramineum*) is believed to have been discovered for the first time in South Australia and the principal symptoms are briefly described.

Field experiments on the control of "covered smut" and "stripe" are described. It was found that the mercurial seed dressings* Ceresan (U.T. 1875A) Bayer Products Ltd., London), Agrosan G and Agrosan 13535 (Imperial Chemical Industries of Australia and New Zealand, Dyestuffs Section) gave satisfactory control of "covered smut" and that Ceresan and Agrosan 13536 gave excellent control of "stripe." Formalin (1-320), sprinkled or used as a steep and copper carbonate gave less satisfactory results in the control of both diseases.

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*It is necessary to emphasise that these organic mercurial compounds are often very poisonous and that particular care must be exercised in using them. When treating grain with these materials special precautions against the risk of inhaling these dusts should be taken, which subsequent to treatment the grain should be touched by hand as little as possible. Supplies of these dusts should, of course, be kept out of the reach of children.

Export of Eggs and Egg Pulp—July-December (Six Months)

[Compiled by A. W. Bowden, Government Statist.]

Grand Total Exports.

Quantity.—Eggs in shell and in pulp in terms of eggs in shell—July-December: 1936, 4,700,000doz.; 1935, 4,800,000doz.; 1934, 5,800,000doz.; 1933, 5,600,000doz.; 1932, 5,000,000doz.; 1931, 3,500,000doz.; 1930, 1,300,000doz.

Value.—July-December: 1936, £220,425; 1935, £214,706; 1934, £265,424; 1933, £263.819; 1932, £245,228; 1931, £154,347; 1930, £70,894.

A comparison with the six months (July-December) of 1935 shows an increase in the Interstate Trade of £13,542 and a decrease of £7,823 for Oversea Countries, making a total increase of £5,719.

New South Wales was the best customer among the other States of the Commonwealth, purchasing £28,448 of eggs in shell and egg pulp.

The following are the details of Exports July-December 1934 to 1936.

State.	Eggs in Shell.		Egg Pulp.		Total Value. £
	Doz.	£	Lbs.	£	
New South Wales (Ex B.H.)	57,830	2,818	804,668	25,630	28,448
Broken Hill	125,246	5,866	12,932	422	6,288
Victoria	64,800	2,952	479,714	15,488	18,440
Other States	109,444	5,750	96,360	3,222	8,972
Total Interstate 1936	357,320	17,386	1,393,674	44,762	62,148
1935	453,957	16,810	1,037,190	31,796	48,606
1934	402,412	14,953	1,451,362	43,701	58,654
Oversea (Direct) 1936	2,745,480	140,542	589,102	17,735	158,277
1935	3,424,430	164,435	69,828	1,665	166,100
1934	4,275,658	206,770	—	—	206,770
Grand Total .. 1936	3,102,800	157,928	1,982,776	62,497	220,425
1935	3,878,387	181,245	1,107,018	33,461	214,706
1934	4,678,070	221,723	1,451,362	43,701	265,424

New Land Development in our Better Rainfall Areas

The development of virgin land, where the rainfall is good and regular production certain, is an undertaking of extreme importance in South Australia, and although definite progress can be recorded, there remains much to be done.

Mr. R. HILL (District Agricultural Adviser) expressed this view in a broadcast talk through 5CL, a report of which appears below.

To facilitate the work done by the extension service officers, the Department of Agriculture has the State divided into eight districts with an Agricultural Adviser stationed in each, and I am fortunate in that my district comprises three counties, namely, Adelaide, Hindmarsh and Carnarvon, all of which contain much of the land under discussion.

An ingression of farmers from other parts of the State not so favourably endowed with rainfall, has been very noticeable during recent years, and their appreciation of the elements provided by nature endorses the wisdom of their action.

To say that all the development was focussed on virgin country would not be correct, because of the immense possibilities presented in the improvement of partially cleared and old established farms through the medium of improved pastures, a phase of agriculture which has shown considerable advancement during recent years in this State. Although that particular type of work, as a means of increasing production is immensely important, it is my intention to confine my remarks to the virgin lands of which there are large areas awaiting conversion to a better use.

With the definite evidence of success shown by progressive men who have pioneered the important work of converting scrub lands into productive pastures, the potential values and possibilities have been exposed, causing unimproved land values to increase and making purchase almost prohibitive to men eager to acquire and develop it. At present this unfortunate position does not apply to County Carnarvon, but it has certainly been a decided hindrance in the "opening up" of much more of the country in the remaining two counties.

Numerous inquiries from prospective purchasers of land are an indication of the attention directed to its potential value, but as many of the interested persons have limited capital, the additional cost of scrub land reduces their prospects of success. However, this does not apply to all scrub land in these counties, and purchases continue to be made at prices which will allow economic development.

Such work has been made possible by the use of subterranean clover and superphosphate as the pioneering materials of soil improvers, paving the way for pasture development. This practice is generally accepted and it appears certain to continue as the most satisfactory, but the methods of soil preparation leave much to be desired and have been the cause of much controversy.

From time to time, various methods of establishing subterranean clover in the most economic manner have met with varied success, and at times outstanding results in one particular year have been misleading, in that they have been too readily accepted, and eventually caused considerable losses by others. The success of South Australian farmers as cereal growers can be largely attributed to their ability to prepare soils thoroughly, but the methods adopted by many interested in pasture development on virgin lands, have not been based on such sound principles. At the present time, however, there is a definite tendency to recognise the value of thorough soil preparation as with other crops and accept the more reliable procedure, even though it means a smaller area treated.

That a few acres well established are worth many containing indifferent pastures is indeed very true, although perhaps not generally realised at the present time, but the economical conversion of large areas of scrub land into productive pastures will be achieved with greater certainty by the acceptance of that policy.

Well established, with a regular income from land already productive, we find some farmers slowly, but surely, increasing the production of their holdings and converting a small area of scrub land into profitable use each year. Their methods vary, many are sound, although slow, and do not require the outlay of much capital, but nevertheless in the aggregate, many acres come under such treatment each year.

Converting a purely scrub block into profitable use presents more difficulties, and without livestock to bring in some revenue and at times to assist materially in handling shoots and bush, one has to adopt a different line of attack. To use a military term one might say that the first line of attack must be followed by a second and perhaps a third necessary to "mop up" obstacles which arise after the first attack is completed. Farmers undertaking this work have so often encountered difficulties which have hindered them in their efforts when dealing with shoots and young bushes in the second and third year following the planting of pastures, that the whole process has become very costly.

The methods recommended to-day, that is to say, fallow and good soil preparation should assist in minimising the total cost of clearing, and in addition, provide a better seedbed ready to be sown at a time of the year most suitable which is indeed an important factor. Such a practice reduces the number of fires necessary to deal with shoots and annual bushes that appear, and provided annual plants are used as a pasture mixture, light disc cultivations in early autumn of the second and third year, will prove to be more effective and economical than the unsatisfactory method which necessitates frequent burning.

The light cultivation given in early autumn will, in addition, provide better growing conditions for the young annual plants resulting in a decidedly improved pasture. That fires assist the germination of numerous scrub bushes is certain, and an additional objection is the destruction of quantities of organic material so necessary to maintain a satisfactory mechanical condition of the soil. Having once burnt the scrub, the less firing done the better, and with a few exceptions, good cultivation will prove to be more satisfactory.

Virgin land built up to a high standard of fertility by annual, and later by perennial plants on the more suitable soils, will eventually be included in a definite rotation of growing cultivated crops and pastures, bringing it into line with much of our valuable and high producing lands capable of carrying a very much increased rural population with bright prospects of success under amenable conditions.

Superphosphate and Ammonia Fertiliser.

"I have a 30 acre paddock which grew a crop of wheat last year, averaging 7 bags to the acre. I have burnt off the stubble and intend cropping same this seeding with oats and barley. Would it be a payable proposition to apply the 1-1 mixture of superphosphate and ammonia, or just the ordinary 45 per cent. superphosphate?"

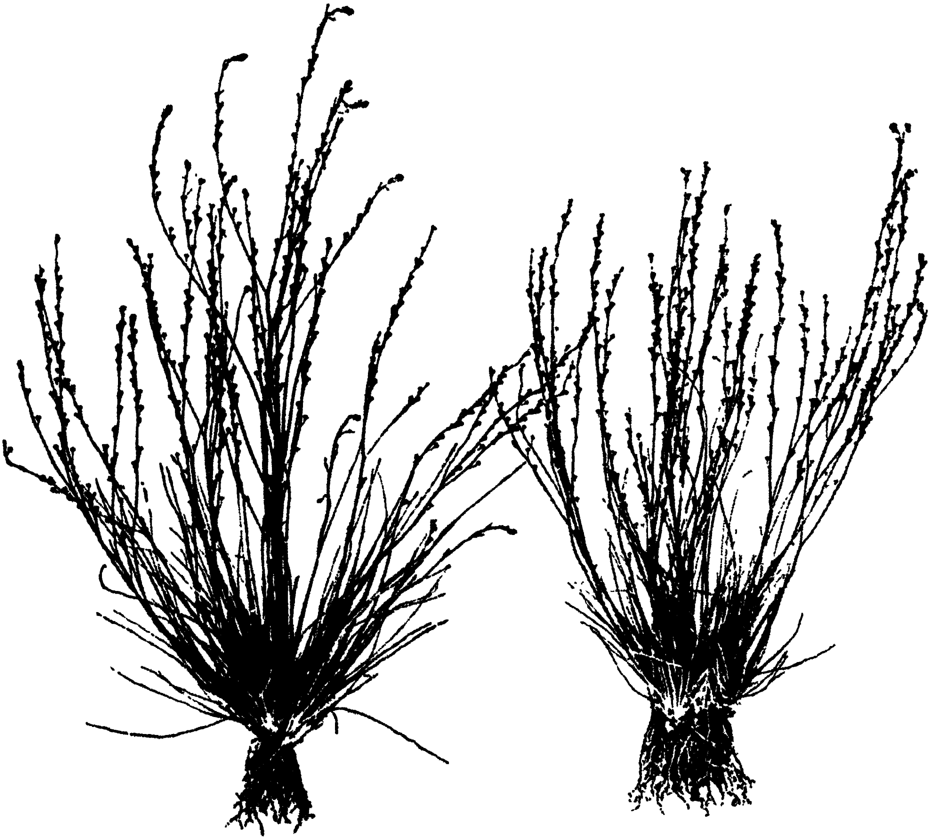
This question from a member of the Blackheath Agricultural Bureau was referred to Mr. R. C. Scott (Chief Agricultural Adviser) who says that except under special circumstances, sulphate of ammonia has not proved a payable proposition when applied to stubble sown cereal crops. Everything appears to depend upon the previous history of the field, and if it has carried leguminous plants in a crop such as pease or clover in the natural pasture, then there is no need to supply mineral nitrogen. Under such circumstances, the pease, clover, &c., build up organic nitrogen, and so provide other plants with their requirements. Consequently, sulphate of ammonia cannot be recommended generally, and superphosphate alone at the rate of about 1cwt. to the acre is likely to prove the most profitable manuring for stubble sown oats or barley.

Wild Onion.

A weed submitted by the Booleroo Centre Branch of the Agricultural Bureau to the Botanist at the Waite Agricultural Research Institute (Mr. G. H. Clarke, B.Sc.), has been identified as the Wild Onion (*Asphodelus fistolosus, L.,*). It is a perennial species, and combines an ability to hold its ground from year to year with a capacity of spreading rapidly from seed, which is formed in large quantities. This combination of character seems to explain the great density of its growth in certain situations.

On arable land it is usually controlled easily enough by cultivation. It is troublesome and more difficult to deal with on uncultivated and particularly on waste land. The method of attack most likely to prove effective in such cases depends to a large extent on particular circumstances, but, broadly speaking, there is a choice between three main types of procedure which may be used in such situations. These are—(1) the use of a chemical weedicide; (2) subjection of the weed to competition with more vigorous pasture species; and (3) a combination of (1) and (2), namely, competition assisted by localised applications of weedicide.

(1) *Chemical Control.*—This method is suitable for areas of a few acres or less, but is apt to prove costly if the weed occupies large areas of ground. Most weed killers sold under proprietary names contain either *chlorates* (sodium or calcium) or *arsenical compounds,* and equally effective results can be achieved by using these substances purchased under their own names. The use of *arsenic* should be avoided, where possible, on account of its intensely poisonous properties which make it necessary to exclude stock rigidly from treated



Wild Onion, showing general habit and mode of branching at the base.

areas, often for a considerable time. The chemical most suitable for trial in the present instance is *sodium chlorate.*

This substance is best applied as a spray of a 10 per cent. solution, made by dissolving 1lb. of the chlorate in each gallon of water used. The substance costs about 60s. per cwt., and about 100galls. of spray are required per acre of densely infested land. The liquid should be applied to the foliage of the weed as a fine misty spray. The knapsack type of sprayer is suitable for the purpose, and the operation is best carried out towards evening, not during the heat of the day.

In using sodium chlorate solutions, care should be taken to see that clothing, &c., is not wetted by the liquid, or if so, that it is well rinsed in clean water before being allowed to become dry. Sprayed material, and especially clothing, is very inflammable when dry, and may take fire if this precaution is neglected. It is best to use rubber overalls and boots, and to avoid smoking when using sodium chlorate.

(2) *Control by Competition.*—Wild Onion is a vigorous grower on waste land, but it will not stand up to competition with sown pasture plants, especially when the latter are topdressed wth superphosphate. At Booleroo Centre it should be possible to grow Wimmera Rye Grass and Early Subterranean Clover, and, in certain situations, lucerne. If the area infested is large, it is suggested that it be ploughed and sown with a pasture mixture and given a liberal dressing of superphosphate. If it is desired to experiment, the following pasture mixtures could be tried on separate areas:—(1) a mixture of 2lbs. per acre each of Wimmera Rye Grass, Early Subterranean Clover, and lucerne; (2) a mixture of 2lbs. per acre each of Wimmera Rye Grass, Early Subterranean Clover and *Phalaris tuberosa.*

In the second case, *Phalaris tuberosa* is rather slow in becoming established, but once it begins, it is a very vigorous grower. Applications of superphosphate are essential, and given these, there should be no difficulty as regards the control of Wild Onion.

(3) *Competition Assisted by Chemical Eradication.*—The competitive treatments outlined can be assisted by localised sprayings with sodium chlorate where the weed is especially dense, or better, by applications of the chlorate dry to individual clumps of Wild Onion plants.

Forage Poisoning.

Reporting the death of cattle which at first showed the following symptoms:—"Signs of stiffness in the legs, their backs arched and ears drooping. About 6 hours later the cattle lose all appetite, go down, and then commence frothing at the nose and mouth, and frequently followed by a cough just prior to death, which generally takes place about 48 hours after first symptoms are noticed," the Secretary of the Chandada Branch of the Agricultural Bureau has been advised by Mr. C. McKenna, B.V.Sc. (Government Veterinary Officer), that the mortalities were due to botulism. This disease, he says, is common at this time of the year, when food supplies are low.

Botulism is due to a poison known as toxin, which is manufactured under certain conditions by a germ, the *Bacillus botulinus.* These germs are common inhabitants of the soil, and frequently invade the carcasses of animals (domestic animals, rabbits, rats, mice, &c.,) left exposed about the farm. They find such carcasses a suitable place on which to multiply, and in this process they give off a powerful poison or toxin which is very fatal to animals if eaten by them. The *Botulinus* germs themselves will not affect stock.

In late summer and early autumn there is generally a feed shortage on the farm, and this food deficiency is especially felt by dairy cows in milk. In their endeavour to supplement their meagre ration, they search over their grazing area for extra food, and in their wanderings they possibly come on the carcass of a farm animal which has been dragged by the farmer to that particular part and left to rot. They find that the bones and rotting flesh are palatable, as they supply a certain amount of protein. Protein is a part of the animal's ration which is essential for forming milk, and it corresponds to the meat part of our diet. It is often deficient in the average dairy cow's rations at this time of the year.

If, however, the carcass on which the dairy cows are feeding should have been invaded by the *Botulinus* germ, it is very probable that the cows will get botulism by taking in the botulism toxin or poison.

The symptoms are briefly that the animal goes down and cannot rise, or only does so with difficulty, and the appetite is poor or in abeyance. Frequently there is paralysis of the muscles controlling the swallowing of food, and the animal may attempt to eat but cannot swallow the food; saliva drips from the mouth.

Treatment of this disease is not satisfactory, and most of the affected animals die. If the animal can swallow (this could be determined by giving a drench of water) 2 drams of Condy's Crystals (Permanganate of Potash) dissolved in water, could be given as a drench. Subsequently, 1 teaspoon of powdered Nux Vomica, mixed in treacle should be smeared on the tongue night and morning.

From what has been said, it is obvious that the only method of dealing with this disease is to prevent it, and prevention consists briefly in carrying out the following measures:—

(1) Better feeding methods at this time of the year. The ration should consist of good quality chaff cut on the green side, plus concentrates. Crushed oats and linseed meal are good concentrates. Another concentrate which could be tried in the mallee areas and where the feed supply is very low, is meat meal. The amount is ½lb. to 1lb. per day. It is difficult to get cows to start eating it, but if small amounts are given at the start, with other concentrates, they will come on to it. Damping the chaff with molasses solution also helps.

(2) The disposal of all carcasses so that dairy cows cannot get access to them.

(3) The provision of a mineral lick such as finely ground sterilised sweet ground bone meal, 40 parts, coarse salt, 60 parts. 2ozs. to 3ozs. of this mixture could be given daily.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged, each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate matter concerning the results obtained from the soaked grain method of feeding in various ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning.—Soaked wheat and barley, at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird, and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

MONTH OF APRIL, 1937.

Test.	No. Eggs Laid.	Value of Eggs.			Cost of Food Fed.			Return Above Cost of Feeding.		
		£	s.	d.	£	s.	d.	£	s.	d.
A	427	2	11	2	1	2	10	1	8	4
B	334	2	0	0	1	1	11	0	18	1
C	407	2	8	9	1	3	8	1	5	1
D	260	1	11	2	1	1	11	0	9	3
E	236	1	8	3	1	2	8	0	5	7

Papers Read at Conferences

Fencing

[W. LASLETT, Allandale East (Lower South-East Conference).]

It is intended to describe what is the most economical fence, and fences that will answer a dual purpose, such as sheep, cattle, and vermin proof. The style of fence recommended is one 3ft. 7in. high, with three posts 5ft. 4in. long, and two droppers between each post, to the chain. The cost of posts and droppers would be about 4s. per chain, and the netting, tie wire and No. 10 wire for tying the barb wire to posts and droppers, about 10s., two plain galvanized wires and one 12-gauge barb, about 3s. 6d., making a total cost of material of 17s. 6d. per chain.

It is necessary to peg the line first, and in doing so it is an advantage to have a set of pegs of the same width painted white near the top. Line the pegs, if possible, from end to end; first place the two end pegs in position, and the other pegs in line. If it is possible to plough the trench for the netting, do so, because this will save a good deal of labour, both in taking out and filling in the trench. Endeavour to erect the posts as the holes are sunk. A guide to the height of the fence can be made by marking the rammer 3ft. 7in. from the ground. To give the fence a neat appearance on the top, it might be necessary to raise or drop a post an inch or two, according to the contour of the ground.

When posts are in position and strainers erected about 6 chains apart and 3in. higher out of the ground than the ordinary posts, boring is the next operation. A good boring gauge is one made of a piece of hoop iron, bent to hand level on the top of the posts, with notches cut indicating where the holes are to be bored. The posts should be bored with a ⅝in. bit, and droppers with a ⅜in. bit. The position of the wires should be: Barb on top of posts and droppers fastened with No. 10 wire, netting wire 6in. from barb, thus allowing netting to go 5in. into the ground, guard wire 17in. from the ground, or 26in. from barb.

In staying strainers where permanent stays are required, mortise a hole in the strainer about midway between the netting and guard wires, place the stay in position and, at the other end, put in an ordinary post, ram it hard up to end of stay, put a wire around the strainer close to the ground, then strain tightly through the hole for the netting wire in the ordinary or stay post. First strain and fasten the barb wire to posts and droppers, pull in the netting wire next, but do not strain until both wires are in position. In straining, do not tap the wire short around the strainer when tying, but rather give it another notch or two on the machine, and thus allow the wire to find its own turn when the plug is removed. When netting is being rolled out, always start from the end that allows the operator to keep his left hand to the fence, and when half a coil has been run out, the slack can be pulled in with the hands and again at the end. Drop the next coil on the netting to hold the strain while tying. First tie the netting around the posts, then make three ties on the top wire and two on the guard wire between each panel. Fill in the trench, and that part of the fence is complete.

For Cattle and Sheep.

A very effective fence is one 3ft. 8in. high, composed of two barb and four plain wires, and at least six posts to the chain, the gauge of the fence from top to bottom is: Barb on top, plain wire 9in. from top, barb 17in. from top and pulled through posts, plain wire 25in. from top, next wire 31in., and another 37in. from top, leaving bottom wire 7in. from the ground, with the space between each wire from top to bottom as follows: 9in., 8in., 8in., 6in., 6in., and 7in. between the bottom wire and the ground. To enable the barb wire to be pulled through the posts it is necessary to bore the posts with a 1¾in. or 1⅜in. bit, and then run a plain wire through the holes. Run out the barb along the next strain, and tie a weight (not too heavy) to the end to keep it from coiling up, and attach the barb to the plain wire with a knot that will easily pull through the holes. Fasten the other end of the plain wire to the axle of the cart, or to a swingletree, drive the horse along, when the barb will follow through the holes. Any ordinary light horse will pull through 6 or even 10 chains of wire without any trouble, but most of the other wire should be strained before pulling in the barb, taking care to strain and tie the top barb to keep the posts in position.

This type of fence will keep all classes of stock securely enclosed, and the cost of material per chain is about 13s.

The Bracken Problem in the South-East

[S. OCKLEY, Penola, (Lower South-Eastern Conference).]

The amazing results of pasture improvement in red gum country throughout the South-East during the last decade have prompted the application of similar methods to other types of soil.

Bracken areas have been tackled by many, and as this tenacious plant has its souring rhizomes in a very large area of the South-East of South Australia, it behoves those who have had success in developing such country to publish their results, because the reclamation of the bracken-infested country would considerably add to the productive area of the South-East.

Generally speaking, bracken indicates a light, well-drained soil, and in England would be considered as indicating a condition of soil texture favourable to agriculture.

Here it has possession of practically all the stringy bark country, and a large portion of the manna, blue, and white gum country. These three last-mentioned trees denote a soil possessing decided possibilities for development; the subsoil necessary for this timber needs to be comparatively shallow, and is generally a red clay and limestone marl mixture well charged with the elements of fertility, especially potash, and with exceptional moisture-holding capacity. This points to the desirability of a deep-rooting plant, and it is predicted that this type of soil will be the most popular in the South-East for lucerne; but first of all the bracken has to be killed.

Its Life History.

The life history of this weed reveals that the rhizome cannot live unless fed by air by the branch or frond which it sends above ground. Cutting or wounding this frond forces the rhizome to come nearer the surface in its action in sending up a new frond. If this frond is allowed to grow and feed the rhizome, the latter regains its strength, descends to its former depth, and continues to flourish.

If, however, this frond is killed before it sends the rejuvenating elements to the root, the latter is further weakened, and a continuation of this process brings the rhizome to the surface, where it dies. In stiff ground, where the rhizomes are shallow, one or two treatments are all that are required to effect this; but in deep sand, as in stringy bark land, half a dozen would be needed.

Building Up the Soil.

The bracken subdued, this top layer of sandy soil needs building up, and here the hardy Subterranean clover obliges in two ways, in so far as it can be sown at the time of the first treatment of the bracken and is performing its job in the interim between cuttings or bruisings, as well as helping to finance the whole business through the grazing it affords.

If a bore hole reveals red clay and marl at a depth no greater than 5ft., lucerne will thrive after the top soil has been improved sufficiently to nourish the young plant until its roots reach the subsoil.

Kikuyu Grass.

Where stringy bark appears, and the sand begins to get deeper and poorer, one need not go past Kikuyu to retrieve it. Establish a plot of Kikuyu in order to be able to obtain roots or cuttings.

Bracken needs to be somewhat sickened before these are planted; plough the ground and plant the cuttings 3ft. to 6ft. apart, from August to October, and check any vigorously growing fronds which spring up during summer and rob the young plants of all surface moisture. Firmly established, Kikuyu will deal with bracken.

This is an astonishing grass, and must feed on air to produce the amount of nourishing fodder that it does on poor, sandy country without any addition of fertiliser. It has a tendency to become choked with the mass of its underground runners, many of which die in dry summers, and allow the remainder to become vigorous again. When selecting roots for planting, do not take them from any root-bound portion of the plot.

When sowing bracken land to clover, apply at least 1 bag of super. per acre and also throw out some soil and burrs from an old clover field. This helps to inoculate the soil.

Where no cutting or bruising implements are available, improvement can be made by drilling the clover seed into standing bracken, provided it is not too thick, and manuring heavily. It is not advisable to burn bracken before sowing.

Foot-rot

[W. J. Jenkin, Mount Gambier (Lower South-Eastern Conference).]

There is no need to stress the enormous toll that this curse takes of South-Eastern flocks, in wool fertility, condition, and lives.

There has been a great deal of research work done by both the Council for Scientific and Industrial Research and private pathologists with the object of culturing a vaccine, but to date with little or no success. Of late there is more hope of eventually producing an efficient vaccine, as scientists have isolated another organism causing foot-rot. Previously *B. necrophorus* was thought solely responsible as the causal organism, and all vaccines were cultured to give an immunity from it; meanwhile sheep were still vulnerable to the attacks of this newly discovered germ. It has been further demonstrated by the Council for Scientific and Industrial Research that the infection is carried by the sheep rather than in the soil. By this is meant that the organisms causing infection do not persist long away from the sheep. In experiments they found no trace of germs in yards or paddocks two weeks after foot-rot sheep had been removed and no sheep put in. Around swamps a slight infestation was noticeable for 12 months. These swamps would be ones which carried water all the year. On the other hand, it was discovered that many apparently healthy sheep carried a slight infestation right through summer, but never showed lame until condition became suitable for a general outbreak.

These sheep are a great menace, as the careful flockmaster will treat the obviously affected and cure them, but these sheep would never show up.

As proof of the dying out of the germ, I can quote two cases locally where men bought foot-rot country and have never had foot-rot on it since buying it; the reason being that the country was accidentally spelled by the purchasers before stocking and has since been stocked with clean sheep.

The logical proceeding appears to be to cure all apparent cases—disinfect the whole flock—spell half the country for two or three weeks, putting double the sheep on the other portion, then disinfect again and use the spelled portion while the balance is spelling. This is simple and almost too easy, but to date I have had 100 per cent. efficiency for 12 months.

Treatment.

By disinfection is meant a prolonged foot immersion—not a walk through, as any lame sheep will hobble through and keep the sore foot out of the bath. I favour a three-quarter hour stand in foot pens. For this purpose I put down a concrete bath or pen to hold 70 or 80 sheep. The plans and measurements were kindly supplied by Mr. Cook, of the Kybybolite Research Station. For the mixture I used "Kleanflock" arsenical dip, as used by the directions for foot-rot. Doubtless other mixtures would be as effective, but I like something that does not stain, and this has proved effective. I am a firm believer in the canvas boot as a cure. The method I adopt with an actual case of rot is to cut away all affected parts, thoroughly bare, until the healthy tissue becomes apparent, with knife or cutters, then fill a boot with any reliable mixture. I use ½lb. bluestone, ½lb. arsenic, ½lb. saltpetre, ½lb. washing soda, and 5galls. of water for the boot mixture. The sheep cannot get its foot out of the mixture in the boot, and very soon generates heat. The pores then open and the medicinal agent penetrates thoroughly. All booted sheep can be kept until last; pen, and then put into the foot bath.

I constantly used the boots on lambing ewes, and left them on overnight in the paddock. In this way I cured most cases as soon as I located them, but could not stop the spread until I used the stand-in pens and spelled the country. I run between 2,300 to 2,500 lambing ewes, and was never without about 100 lame sheep until I adopted what I term the triple attack: First, treat every actual case you can see; second, bath the lot; third, spell the country for two weeks. I carried this out last autumn (1936), and have never had a case since, although my sheep have never been in the bath since. I intend to bath them again after crutching as a precautionary measure, as I have bought sheep during the season.

Many owners say that it is hard to spell half the country during summer or autumn, which is undoubtedly the best time to treat them. It is hard, when feed is short, but two weeks on short commons will not injure one's stock as much as the usual outbreak of foot-rot.

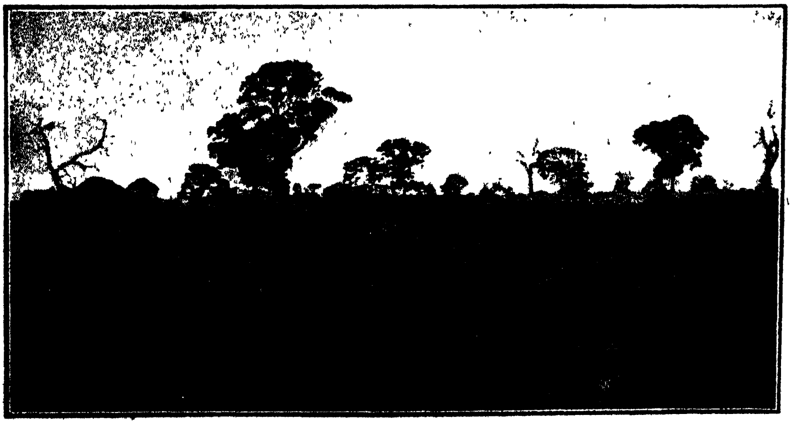
As many men now make provision for hand feeding, sheep do not suffer much when paddocks are double banked. Perhaps my experience has been lucky, but I have a neighbour now trying it. This flockmaster previously used the walk-through bath, and worked hard and often without ever catching up to the ever-increasing number of patients. He now tells me it is already dying out.

Some Notes on Pasture Species of Importance to the Lower South-East

[N. J. McBain, Coonawarra.]

Choosing the Right Pasture Species.

A question which many are asking at this time of the year is "What shall I sow to improve my paddocks?" We want pastures which will carry more stock and will also carry them well. At the same time we want pastures which will increase in productivity year after year, until a very high state of production is reached. What is generally accepted as the aim is a balanced pasture of about 60 per cent. grasses and 40 per cent. legumes.



Subterranean Clover Ready for Stacking.

Factors which Determine the Value of a Particular Species.

In considering a particular pasture species, one has to consider the following factors which are going to determine its value:—

1. Its suitability to the varying soil, climatic and biotic conditions.
2. Its yielding capacity—total yield for the year, seasonal yield, edible yield and yield under grazing.
3. Its aggressiveness and ability to withstand competition.
4. Its persistency under unfavourable conditions and its persistency under grazing.
5. Its nutritive value and palatability.

For a particular paddock that is to be sown, there are many suitable grasses and clovers, but unless under exceptional conditions, very few with any likelihood of ultimate success—very few that, with proper management would be as good or better in 6 years' time than when first established. In fact, the pasture species of major importance can be counted on the fingers of one hand, except under exceptional conditions.

The plants to be considered here are clovers, Subterranean and Strawberry (possibly also Black Medic), and grasses, Wimmera and Perennial Rye, and *Phalaris tuberosa*. It is proposed to refer to each of these with regard to their chief characteristics, which are likely to be of special advantage or disadvantage to local conditions.

Grasses.

WIMMERA RYE GRASS.

Advantages.—This is the most adaptable of all our grasses to varying conditions of soil fertility and varying climate. It can be established very easily and very cheaply, and is therefore the most popular grass for turning the heavy nitrogen supplies of old clover land into money. It makes fairly good winter growth.

Disadvantages.—On the other hand, it is an annual, giving its great bulk of production in late spring, which, is the time of the year when we least need feed. It is a heavy nitrogen feeder, quickly going out if the clover with which it is grown is not supered. If sown on the black reclaimed swamp type of soil, it quickly exhausts nitrogen supplies unless sown with a clover. This, together with the compacting of the soil surface, makes it unproductive in about 3 years. Its greatest use is as a mixture with Subterranean Clover, and on other soil can be considered only a temporary pasture. The aim in this district, is for permanent pasture.

PERENNIAL RYE GRASS.

This grass, with White Clover, under suitable conditions forms the ideal pasture of which New Zealand and some other parts are making such successful use. However, in our particular district, it is notable that Certified N.Z. Hawke's Bay seed has not proved persistent in old clover stands at the Kybybolite Research Station, on the Waite Institute experimental plots at Conmurra, and it has failed after 4 years on our black soils. In this connection, we must remember that we are in a Mediterranean climate, having a heavy winter rainfall and a definite summer drought period. Our lack of effective rains in summer, gives us almost as pronounced a drought for a time as occurs in the north of this State. We can never hope to establish the dense stands of Perennial Rye Grass as are found in New Zealand districts which have the advantage of summer rain, unless with more drought resistant strains.

PHALARIS TUBEROSA.

Advantages.—*Phalaris tuberosa* is a heavier producer of feed in winter than any other grass so far investigated. It is thoroughly persistent, small plots having withstood heavy grazing in this district for over 20 years.

Disadvantages.—It is a very delicate plant for the first three months of its growth, needing therefore, very careful soil preparation in order to be as fine and as near weed-free as possible. In addition, the seed is costly, although it has fallen in price a great deal lately, and it has been found that 2lbs. to 3lbs. per acre give good stands.

Phalaris tuberosa.

Clovers.

SUBTERRANEAN CLOVER.

This clover is so well known that it can be practically passed over. It is at present the most important pasture plant and the greatest soil builder in South Australia. A good crop puts into the soil each year as much nitrogen as would be supplied by 5cwts. of sulphate of ammonia, costing nearly £3. It is the starting point for the introduction of grasses into poorer soils, forming in the long run, balanced clover-grass pastures. Its advantages and disadvantages are too well known to be discussed.

STRAWBERRY CLOVER.

This clover is lesser known, but is coming into prominence for our black soil, on which New Zealand White Clover fails to survive the summer drought, and when Subterranean Clover for some as yet unaccountable reason, fails also.

Advantages.—Strawberry Clover is thoroughly persistent here, and produces a great bulk of feed well on into summer; its roots, like lucerne tapping the moist underneath soil. It is very aggressive, and soon crowds out annual clovers, thistles, etc., its runners rapidly claiming the surrounding soil. Its feeding quality is practically the same as lucerne.

Disadvantages.—This clover has, until recently, been very hard to establish from seed. However, it has been found that this is due to a hard outer seed coat impermeable to water. When it is scratched with emery paper or in some other way, its germination is as good as Subterranean Clover. Again there is a great deal of strain variation, most of the commercial strains or mixtures of strains showing very poor winter growth compared with some strains which have been selected. The disadvantage of high seed cost is not as great as it seems, as ½lb. to the acre is an ample seeding under good conditions, there being some 350,000 seeds per lb.

WHITE CLOVER.

This clover can be passed over quickly, as it will not persist here unless under irrigation, and as the main coastal land where it does manage to struggle through summer, its place could, in those places be better taken by Strawberry Clover.

Some Effects of Phosphate on Nitrogen Accumulation by Subterranean Clover.

The object of supering is not so much to bring up the phosphate content of the soil as to encourage the growth of clovers, thus indirectly building up the nitrogen content. Available nitrogen content can be taken almost as a direct measure of fertility. It has recently been shown that on Subterranean Clover pasture, the amount of nitrogen put into the soil is in direct proportion to the amount of superphosphate added, up to 4cwts. at least. Thus, in any one season, as much nitrogen as is put into the soil by the application of say 3cwts. to 1 acre, as by 1cwt. each to 3 acres. Over 2cwts. of superphosphate does not greatly increase the growth of Subterranean Clover, but the nitrogen content of the plant and accumulation are increased in practically direct proportion to the increase in phosphate supply. By this means light soil has been made clover-sick in the third year of sowing down. In the actual experiment, light soil at Meadows was made to carry a good crop each of Wimmera Rye Grass and *Phalaris* in that time. From this it seems probable that it will be more profitable in the long run on light country, to concentrate on a smaller area of clover with very greatly increased supering—at least 3cwts. annually—to bring it more quickly up to high fertility, carrying a balanced pasture of grass and clover. In this connection it is interesting to compare the heavy superings of New Zealand.

Summary.

1. There are only 5 pasture species which as yet have shown themselves of major economic importance in the Lower South-East.
2. On light country, best chance of building up the soil fertility to carry grass-clover pasture is to apply phosphate in much higher quantities.
3. Strawberry Clover of good strain, together with *Phalaris tuberosa*, is at present likely to be the best pasture mixture on the black soil.

Advisory Board of Agriculture

The monthly meeting of the Advisory Board was held on Wednesday, 28th April, 1937, there being present Hon. A. L. McEwin, M.L.C. (Chairman) Messrs. A. M. Dawkins, P. J. Baily, S. Shepherd, F. Coleman, H. N. Wicks, Dr. A. E. V. Richardson, Prof. A. J. Perkins, and the Secretary (H. C. Pritchard).

Apologies were received from Messrs. A. J. A. Koch and R. H. Martin.

Ridley Memorial Trust.—Mr. A. M. Dawkins was re-appointed representative of the Advisory Board on the Ridley Memorial Trust.

New Branch.—Approval was given to the foundation of a Branch at Glencoe East with the following as foundation members:—L. Williams, I. Sims, W. F. Coop, S. W. McRostie, R. C. Gunn, K. McCarthy, C. McCarthy, J. Dow, D. W. Dow, L. Berkefeldt, R. C. Childs, and R. Poulton.

Branches Closed.—It was decided to close the Tarpeena, Stirling, Rhynie, Amyton and Salisbury Branches.

New Members.—Approval was given to the addition of the following names to the rolls of existing Branches:—Alawoona—T. W. D. Willson; Balumbah—Frank Evans; Blackheath—A. P. Talbot, K. S. Talbot; Boor's Plains Women's—Miss J. Stanway, Miss S. Rodda; Brentwood—R. Boundy; Clarendon—F. Shiedow; Georgetown Women's—Mrs. J. Bond, Mrs. H. Freeman, Mrs. F. Read, Mrs. Hartmann; Hartley—Eric A. Cross, Ronald H. Cross; Kalangadoo Women's—Miss Etta Davies, Miss Eileen Dowdell, Miss Jean McKenzie, Miss Maud McKenzie; Koolunga—Frederick A. Powell; Koolunga Women's—Mrs. Basil Fuller, Miss Norma Rogers; Koppio—J. Rhue; Kyancutta—C. R. Sheahan; Kybobolite—W. C. Johnston; Mangalo Women's—Miss Coral Hannamann; Milang Women's—Miss H. M. Mann, Miss H. Newland, Miss Joy Eichner, Miss B. P. Yelland, Miss E. Findlater, Mrs. Francis, Sister Camac, Mrs. L. R. Pavy; Millicent Women's—Miss Delsie Osborne; Murraytown—R. Deer, G. Crossman, P. L. Blesing, Max Woolford; Narridy—A. Crawford; Owen Women's—Mrs. C. W. Marshman; Penwortham—Geof. Ashton, A. G. Benda; Petina—H. Doley, T. Lovegrove, James Barcroft, G. W. Schulz, Albert Trezona; Poochera—F. E. Gosling; Robe—C. A. Goddard; Rosedale—R. A. Needle; Saddleworth Women's—Miss Louisa McGrath, Mrs. C. Webb; Summerfield—J. O. Bottroff, O. Schroeder, H. A. Kretschmer, I. L. Paech, O. Gierke; Warcowie—Allan McPherson; Wasleys—R. T. S. Dent, E. H. Obst; Willowie Women's—Mrs. J. Stone, Miss M. Stone, Miss Kumnick, Miss L. Foulis; Wolseley—G. R. McLennan; Yadnarie—H. W. Zinkler.

Life Members.—Mr. W. S. Gray (Marama) was approved as a life member of the Bureau. Various items were taken in Committee.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of April, 1937; also the average precipitation for April, and the average annual rainfall.

Station.	For April, 1937.	Av'ge. for April.	To end April, 1937.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	—	0·21	0·37	4·60
Marree	0·04	0·37	2·45	5·80
Farina	0·08	0·43	3·23	6·37
Copley	0·16	0·55	3·19	7·76
Beltana	0·21	0·54	3·82	8·39
Blinman	0·16	0·79	5·28	11·71
Hookina	0·05	0·62	5·28	10·94
Hawker	0·11	0·86	7·20	12·09
Wilson	0·14	0·81	5·89	11·65
Gordon	0·14	0·50	5·74	10·33
Quorn	0·20	0·88	7·32	13·10
Port Augusta	0·16	0·75	4·28	9·40
Bruce	0·14	0·49	6·62	9·74
Hammond	0·66	0·82	5·33	11·05
Wilmington	1·62	1·33	6·84	17·18
Willowie	0·68	0·71	4·90	12·10
Melrose	2·34	1·63	5·75	22·80
Booleroo Centre	1·31	1·13	5·67	15·14
Port Germein	0·61	1·10	3·83	12·51
Wirrabara	2·32	1·44	8·19	19·22
Appila	0·99	1·14	5·43	14·59
Cradock	0·17	0·71	5·63	10·67
Carrieton	0·25	0·77	4·43	12·11
Johnburg	0·12	0·64	6·50	10·49
Eurelia	0·43	0·82	5·14	12·66
Orroroo	0·86	0·91	5·93	13·12
Nackara	0·05	0·58	6·52	11·09
Black Rock	0·58	0·84	4·16	12·26
Oodlawirra	0·18	0·70	5·74	11·34
Peterborough	0·47	0·91	3·94	13·14
Yongala	1·31	1·03	5·42	14·37
North-East.				
Yunta	0·11	0·58	7·61	8·44
Waukaringa	0·01	0·51	6·18	7·82
Mannahill	0·02	0·53	6·24	8·08
Cockburn	—	0·59	4·04	7·81
Broken Hill	—	0·69	3·79	9·40
Lower North.				
Port Pirie	0·86	1·15	4·66	13·18
Port Broughton	0·96	1·17	4·47	13·87
Bute	0·74	1·23	4·14	15·42
Laura	0·98	1·46	4·97	17·93
Caltowie	1·02	1·25	4·96	16·69
Jamestown	1·78	1·24	6·03	17·68
Gladstone	0·86	1·34	4·67	16·31
Crystal Brook	0·80	1·24	5·81	15·79
Georgetown	0·97	1·50	4·78	18·24
Narridy	1·14	1·24	5·82	15·74
Redhill	1·78	1·31	6·12	16·55
Spalding	1·81	1·01	5·27	18·68
Gulnare	2·28	1·10	5·48	18·51
Yacka	1·23	1·17	5·25	15·38
Koolunga	0·89	1·15	4·22	15·29
Snowtown	0·93	1·25	5·06	15·69
Lower North—*continued.*				
Brinkworth	1·95	0·92	5·35	15·72
Blyth	1·57	1·35	3·96	16·73
Clare	2·01	1·95	6·40	24·43
Mintaro	1·97	1·58	5·28	23·30
Watervale	2·37	2·22	6·67	26·69
Auburn	1·30	1·81	4·62	23·92
Hoyleton	0·79	1·48	3·68	17·25
Balaklava	0·46	1·39	4·84	15·41
Port Wakefield	0·79	1·14	4·09	12·93
Terowie	1·04	0·88	5·38	13·27
Whyte-Yarcowie	1·34	0·94	5·95	13·54
Hallett	1·28	1·13	6·43	16·39
Mount Bryan	1·51	0·95	5·79	16·76
Kooringa	1·35	1·20	5·27	17·78
Farrell's Flat	1·48	1·40	5·51	18·52
West of Murray Range.				
Manoora	1·14	1·32	3·75	18·91
Saddleworth	1·09	1·62	5·24	19·56
Marrabel	1·28	1·60	4·44	19·91
Riverton	1·47	1·72	4·79	20·79
Tarlee	0·59	1·49	3·21	18·06
Stockport	0·73	1·34	3·33	17·02
Hamley Bridge	0·47	1·35	3·25	16·52
Kapunda	0·74	1·57	3·78	19·74
Freeling	0·64	1·39	2·66	17·79
Greenock	0·99	1·61	3·84	21·47
Truro	0·92	1·48	3·72	19·75
Stockwell	0·74	1·55	3·31	20·02
Nuriootpa	1·07	1·56	4·54	20·74
Angaston	1·11	1·66	5·60	22·33
Tanunda	1·26	1·70	4·80	21·97
Lyndoch	1·24	1·67	4·62	23·28
Williamstown	1·17	2·03	6·24	27·54
Adelaide Plains.				
Owen	1·23	1·25	4·29	14·78
Mallala	0·42	1·34	2·95	16·43
Roseworthy	0·74	1·40	2·88	17·43
Gawler	0·68	1·55	3·95	18·85
Two Wells	0·53	1·36	2·59	15·80
Virginia	0·75	1·37	3·71	17·22
Smithfield	0·55	1·12	5·70	17·68
Salisbury	0·53	1·54	4·80	18·55
Adelaide	0·66	1·72	4·92	21·17
Glen Osmond	1·15	2·00	5·66	25·97
Magill	1·14	1·93	6·32	25·36
Mount Lofty Ranges.				
Teatree Gully	0·96	1·90	6·63	27·03
Stirling West	3·76	3·57	11·96	47·01
Uraidla	3·66	3·19	10·92	43·83
Clarendon	2·57	2·71	6·67	32·81
Happy Val'y Res.	1·10	—	5·42	—
Morphett Vale	0·98	1·80	4·23	22·62
Noarlunga	0·88	1·63	3·51	20·35
Willunga	0·86	1·93	3·92	25·96
Aldinga	0·56	1·47	4·22	20·21

RAINFALL—*continued.*

Mount Lofty Ranges—*continued.*

Station.	For April, 1937.	Av'ge. for April,	To end April, 1937.	Av'ge. Annual Rain-fall.
Myponga	1·32	1·83	5·04	29·72
Inman Valley .	1·87	—	5·04	—
Yankalilla	1·17	1·62	3·90	22·78
Mount Compass	2·27	2·55	5·63	36·25
Mount Pleasant	1·29	1·99	5·99	27·08
Birdwood	1·55	2·04	6·11	29·02
Gumeracha ...	1·84	2·43	7·83	33·28
Millbrook Res..	1·67	1·83	8·75	34·50
Lobethal	2·52	2·53	9·22	35·94
Woodside	2·13	2·18	7·09	32·16
Hahndorf	1·62	2·45	7·85	34·82
Nairne	1·73	2·08	6·23	28·14
Mount Barker	1·74	2·24	6·76	31·24
Echunga	2·19	2·54	7·34	33·30
Macclesfield ..	2·00	2·30	5·62	30·37
Meadows	3·11	2·81	7·30	36·02
Strathalbyn ..	1·39	1·42	3·86	19·34

Murray Flats and Valley.

Station.	For April, 1937.	Av'ge. for April,	To end April, 1937.	Av'ge. Annual Rain-fall.
Meningie......	0·52	1·45	3·17	18·29
Milang	0·70	1·22	2·90	14·85
Langhorne's Ck	0·41	1·16	2·75	14·93
Wellington ...	0·69	1·18	3·46	14·66
Tailem Bend ..	0·56	0·83	3·29	15·07
Murray Bridge	0·41	1·10	2·09	13·49
Callington	0·61	1·12	3·04	15·14
Mannum	0·46	1·01	3·56	11·49
Palmer	0·50	0·93	4·23	15·63
Sedan	0·17	0·87	5·02	12·01
Swan Reach...	0·22	0·55	2·82	10·62
Blanchetown ..	0·29	1·01	2·51	10·95
Eudunda	0·56	1·33	2·78	17·13
Point Pass ...	0·89	1·03	4·34	16·66
Sutherlands ..	0·22	0·61	4·55	10·71
Morgan	0·18	0·62	3·50	9·10
Waikerie......	0 24	0·54	2·66	9·59
Overland Corner	0·28	0·74	2·25	10·18
Loxton	0·26	0·50	2·02	11·34
Berri	0·77	0·53	2·75	10·03
Renmark	0·58	0·66	3·33	10·33

West of Spencer's Gulf.

Station.	For April, 1937.	Av'ge. for April,	To end April, 1937.	Av'ge. Annual Rain-fall.
Eucla	0·87	1·06	2·27	10·08
Nullarbor	0·32	0·62	0·89	8·87
Fowler's Bay .	0 37	0·84	0·71	11·93
Penong	0·37	0·82	0·96	12·28
Koonibba	0·21	0·70	1·56	12·18
Denial Bay ...	0·30	0·87	0·97	11·33
Ceduna	0·11	0·61	0·72	10·32
Smoky Bay ...	0·33	0·60	1·53	10·50
Wirrulla	0 31	0·57	5·09	10·87
Streaky Bay ..	0·24	0·57	1·43	14 91
Chandada	0·64	0·84	1·90	12·66
Minnipa	0·61	0·68	2·62	13·97
Kyancutta ...	0·80	0·90	1·76	13 45
Talia	0·42	0·63	2·72	14·76
Port Elliston .	0·77	1·06	3·18	16 53
Lock	0·43	0 80	2·92	16·44
Mount Hope ..	0·98	—	5·76	—
Yeelanna	0·53	0·89	3·57	16·11
Cummins	0·54	0·85	3·99	17·70
Port Lincoln..	0·60	1·42	2·44	19·35
Tumby	0·21	0·93	1·81	14·29
Ungarra	0·47	0·87	3·68	16·94
Port Neil	0·24	0·84	1·74	13·16

West of Spencers Gulf—*continued.*

Station.	For April, 1937.	Av'ge. for April,	To end April, 1937.	Av'ge. Annual Rain-fall.
Arno Bay	0·54	0·99	2·58	12·82
Rudall	0·33	0·92	2·75	13·23
Cleve	0·93	1·16	2·30	14·96
Cowell	0·62	1·12	1·99	11·06
Miltalie	1·02	1·18	5·22	13·75
Mangalo	0·77	0·89	2·34	13·86
Darke's Peak ...	0·60	0·80	4·19	15·24
Kimba	0·39	0·75	2·55	11·84

Yorke Peninsula.

Station.	For April, 1937.	Av'ge. for April,	To end April, 1937.	Av'ge. Annual Rain-fall.
Wallaroo	0·69	1·24	3·51	13·97
Kadina	1·27	1·41	4·48	15·59
Moonta	0·84	1·42	4·39	15·04
Paskeville.......	0·69	1·21	3·17	15·44
Maitland........	0·89	1·67	3·88	19·86
Ardrossan.......	1·10	1·16	3·63	13·96
Port Victoria ...	0·84	1·28	3·50	15·39
Curramulka	1·20	1·25	3·14	17·81
Minlaton........	1·03	1·36	3·11	17·72
Port Vincent ...	0 81	0·89	2·35	14·37
Brentwood	1·13	1·08	3·66	15·61
Stansbury	0·93	1·26	2·64	16·81
Warooka	0·80	1·31	3·07	17·44
Yorketown	1·14	1·28	2·38	16·88
Edithburgh	0·64	1·32	2 23	16·38

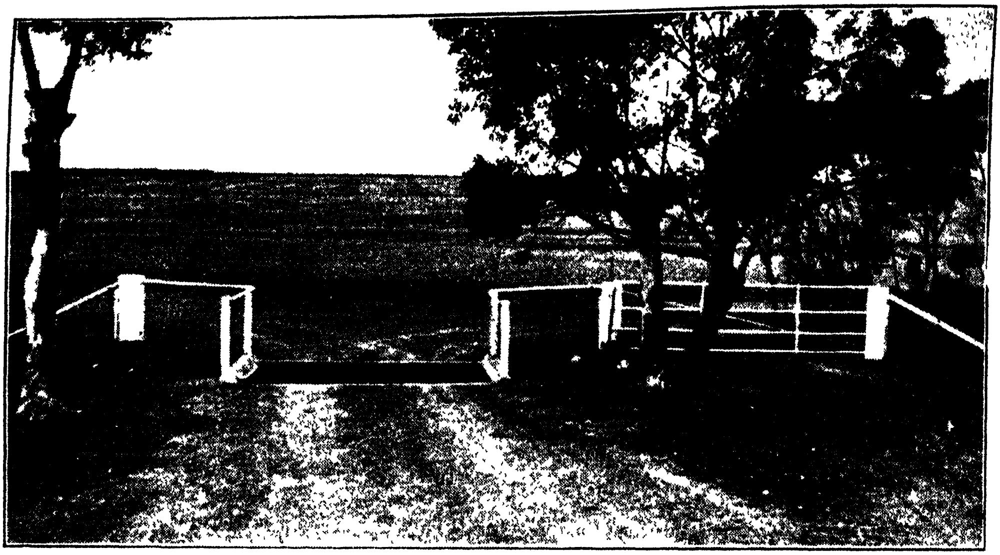
South and South-East.

Station.	For April, 1937.	Av'ge. for April,	To end April, 1937.	Av'ge. Annual Rain-fall.
Cape Borda	1·58	1·86	3·90	24·87
Kingscote	1·46	1·41	2·85	19·27
Penneshaw	1·38	1·33	3·09	19·18
Victor Harbour .	1·12	1·63	4·07	21·43
Port Elliot	0 88	1·56	3·98	19·94
Goolwa	0·96	1·36	3·87	17·84
Maggea	0·43	0·71	2·38	10·02
Copeville	0·32	0·54	2·60	11·51
Claypans	0·34	0·62	2·14	10·53
Meribah	0·31	0·93	2·07	11·11
Alawoona	0·47	0·73	2·81	10·26
Caliph	0·89	0·92	3·10	10·44
Mindarie	0·21	0·59	2·37	12·13
Sandalwood	0·60	0·55	2·90	13·60
Karoonda	0·49	0·68	2·83	14·18
Pinnaroo	0·11	0·79	2·46	14·19
Parilla..........	0·18	0·83	2·88	13·64
Lameroo	0·38	1·02	2·85	15·79
Parrakie	0·30	0·75	2·73	14·61
Geranium	0·38	0·97	3·40	16·39
Peake	0·34	0·86	4·22	15·95
Cooke's Plains ..	0·79	1·11	3·94	15·29
Coomandook	0·30	1·02	2·87	17·03
Coonalpyn	0·30	1·36	3·08	17·65
Tintinara	0·43	1·32	4·01	18·72
Keith	0·31	1·16	3·60	17·96
Bordertown	0·84	1·53	5·49	19·14
Wolseley........	0·97	1·50	4·67	18·47
Frances.........	0·58	1·45	4·70	20·12
Naracoorte	1·22	1·75	4·90	22·65
Penola	0·69	1·86	4·96	25·94
Lucindale	1·16	1·84	5·79	23·47
Kingston	0·60	1·84	3·53	24·24
Robe	0·67	1·77	3·52	24·65
Beachport	0·71	1·92	4·71	27·07
Millicent	1·21	2·37	6·46	29·87
Kalangadoo	1·06	2·15	6·14	32·05
Mount Gambier.	0·83	2·33	4·45	30·34

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East, 23rd April, Conference report; Appila Yarrowie, 2nd April, "Experimental Plots"—L. J. Cook; Balumbah, 7th April, "Colt Breaking"—W. H. Riches; Baroota, 12th April, "Farm Horses"—J. Spencer; Beetaloo Valley, 22nd March, Conference report; Blackheath, 1st April, "Beekeeping"—H. G. Pym; Black Springs, 23rd March, "Fallow Cultivation"—O. Bowden; 19th April, Address, C. A. S. Hawker, M.H.R.; Blewitt Springs, 20th April, Question Box; Blyth, 5th April, Seed Wheat Competition; Farm Machinery"—A. Rodda, Senior; Brentwood, 8th March, Harvest Report; 12th April, Conference Report; Brimpton Lake, 15th April, Harvest Reports; Butler, 12th April, Harvest Reports; Cambrai, 7th April, "Sheep," E. Hoad; Carey's Gulley, 12th April, Discussion; Chandada, 13th March, Discussion; Coonalpyn, 24th March, "Wheat Diseases"—R. L. Griffiths; 13th April, "Wool Classing"—C. A. Goddard; 24th April, "Summer Fallowing"—R. V. Potter; Dorset Vale 3rd April, Formal; Glencoe East, 13th April, Inaugural Meeting; Goode, 24th March, "Sheep"—W. H. Brownrigg; Hartley, 24th March, Discussion; 21st April, Annual Social; Hilltown, 6th April, "Visit to Roseworthy College"—J. Summerville; Inman Valley, 24th March, Visit to Kuitpo Colony; 15th April, "Potatoes"—H. H. Orchard; Iron Bank, 17th March, "Hay and Silage"—M. Davis; Jamestown, 12th April, Annual Meeting; Kelly, 3rd April, Visit from Pinkawillinie; Kilkerran, 22nd March, "Wheat Varieties"—B. A. Koch; Kingston, 8th April, "Experimental Plots"—L. J. Cook; Koonunga; 23rd March, Address—H. B. Barlow; Koppio, 24th March, Discussion—Dipping; Kyancutta, 6th April, Reports on Wool Returns; Lameroo, 27th March, "Percheron Horses—W. J. Morcom; Light's Pass, 19th April, "Fertilisers"—A. R. Ninnes and H. C. Reade; Lobethal, 15th October, "Trip to N.S.W."—T. Smee; Lyndoch, 23rd February, Discussion; 23rd March, Conference Report; Marama, 15th April, "Pig Management"; Milang, 24th March, "Cereal Diseases"—F. C. Gross; 17th April, "Bulk Handling"—G. Ross; Miltalie, 22nd April, "Seeding Preparations"—A. M. Wilson; Mount Hope, 6th April, Question Box; 20th April, "Tour of New Zealand"—A. J. Vigar; Murraytown, 17th April, "Feeding Ewes"—Ron Tregenza; Myponga, 11th March, "First Aid"—Dr. Souter; Nantawarra, 25th March, "Fire Fighting"; Narridy, 3rd April, "Improved Pastures"—R. C. Scott; Orchard; Penwortham, 31st March, "The Wool Industry"—C. A. Goddard; 24th April, "Improver Pastures"—R. C. Scott; Poochera, 6th April, "Sheep"—G. Wheal; Port Elliott, 17th April, "Breeding Baby Beef"—Geo. Depledge; Pygery, 23rd March, "Soya Beans"; Ramco, 27th April, "Black Pieces in Dried Apricots"—J. J. Odgers; Riverton, 19th April, "Crop Rotation"—O. Bowden; Roberts and Verran, 31st March, Harvest Reports; Rosedale, 31st March, "Horse Breeding"—C. Mattiske; South Kilkerran, 5th March, "Entrance Ramps"—E. F. Heinrich; Springton, 7th April, Harvest Reports; Stockport, 8th April, "Wool Industry"—C. A. Goddard; Summerfield, 9th April, Inaugural Meeting; Sutherlands, 1st April, "Farm Blacksmithing"—A. M. Twartz; Tantanoola, 3rd April, Discussion; Taplan, 14th April, Question Box; Tarlee, April, "Handyman on the Farm"—C. R. Kelly and O. Stratford; Truro, 19th April, "Farm Engines"—H. Wilson; Upper Wakefield, 25th March, "New Zealand—R. C. Scott; 22nd April, Question Box; Wandearah, 24th April; Social, Address—R. C. Scott; Warcowie, 16th March, "Farm Harness"—C. Sanders; 17th April, Agricultural Display; Willowie, 6th April, Discussion—Stock Branding; Yandiah, 22nd March, Address—J. O. Hatter; 9th April, "Farm Team"—O. M. Kelly.



Entrance Ramps or Cattle Pits.

[E. F. Heinrich, Sth. Kilkerran.]

The best entrance and of course the most convenient in these days of motors and motor transport is the ramp or cattle pit. These are absolutely necessary at the less frequented railway crossings, and almost as necessary on a farm.

Some may regard a ramp as a luxury, but the convenience is worth the initial outlay, and there is no further upkeep or expense excepting the cleaning out of the pit, and, if the owner is so minded, the occasional painting of posts and rails.

There are numerous kinds of cattle pits, ranging from the ones made by just laying a few mallee rails across an open pit and anchoring them in the earth, to the nicely finished job made with railway lines and concrete.

There are also some ready made grids on the market, which can be laid over the pit.

Materials.

The best type (and of course the more expensive type) is the ramp of railway lines and concrete. The essential materials are 2, 9ft. 6in. lengths of fairly solid rails; 12, 12ft. lengths of rails with a reasonably good face or crown (of course the web and flange have to be fairly sound); 4, 6ft. lengths of railway or tram line, a small quantity of 8-wire Cyclone, and 2, 18ft. 6in. lengths of 1¼in. piping.

The other requirements are a sufficient quantity of crushed stone or river gravel, sand and cement for the cement concrete; 4 old kerosene tins, and a quantity of old match board or some such suitable material for moulds.

Position of the Ramp.

First lay out the position of the ramp. If building one to pass straight out on to a road, it is very desirable to set it back from the fence line and away from the road, leaving a flared entrance 6ft. deep by 12ft. wider than the ramp. This is to allow for a comfortable turn in and out.

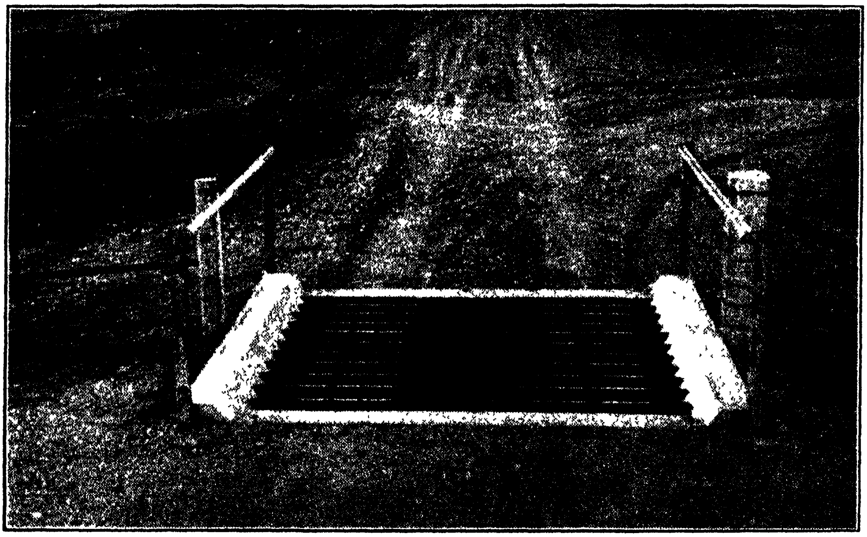
The pit should be sunk square with the road (that is the turn in is square off the road) and about 6ft. back from the fence line.

Constructing the Pit.

The dimensions for the pit are 12ft. wide x 9ft. 6in. long x 22in. deep. The rails should be laid level and just enough above the level of the surrounding earth to prevent the pit from flooding with water from heavy rains.

The next procedure is to rest the 2, 9ft. 6in. bearer rails on blocks to bring the tops of the ramp rails to the required level. These should run lengthwise through the pit, about 4ft. 9in. apart (which is about the standard track of motor vehicles), equidistant from the side walls. The moulds are then placed around the inside of the pit. The tops of the moulds should be level with the ramp rails. The mould boards at either end therefore will have to be recessed to take the ends of the bearer rails.

Matchboard makes ideal moulds, as it is light and comparatively easy to remove. The moulds from the side walls are best put in place in two sections, as they are more easily removed afterwards, and if more than one ramp of the same size is to be built the boards can be used repeatedly. The moulds should be placed to leave a 12in. wall all round. The walls are staked with the ordinary steel 1¼in. x ¼in. dropper, used on the flat inside and on edge outside to form a T with the moulds running between; of course at the joint it will be necessary to use both inside and outside droppers on the flat in order to hold the joint firm.



Straight-through Ramp (10ft.) on Mr. E. F. Heinrich's property, South Kilkerran

Before placing the top rails on the bearer rails take the 4 kerosene tins and after cutting the top and bottom out of them put a T cut on two sides at one end and hook them by this method over the flange of the bearer rails so that they hang down and form moulds for carrier pillars to support the bearer rails.

Two tins equally spaced on each bearer rail will support the rails and make the finished job strong enough to withstand heavy loads.

When the tins are in position they will hang some small distance clear of the bottom of the pit. Form a mould of matchboard or blocks around the bottom of the tin, but larger than the tin (*i.e.*, about 18in. to 20in. square) to give the pillar a good big base on the floor of the pit.

FITTING THE RAILS.

The 12ft. rails are then spaced evenly at about 8½in. centres and lying across the bearers, the two end rails being built partly into the walls; and at least the concrete of the walls should come against one side and underneath them, thus forming a solid edge to the concrete wall on the inside.

Place a board mould on the front and back edge of the pit to come level with the rail and securely stake it in place. Then place boards along the side walls to come about 4in. or 5in. above the top of the rails. A 6in. matchboard with strips of similar material nailed on at intervals to fit between the rails is placed at an angle from the inner edge of the side walls to within 5in. or 6in. from the outside mould and is fastened to this, thus completing the moulds. Sufficient stakes or droppers should be driven in and propped to prevent the matchboard moulds from bulging.

U shaped pieces of No. 8 wire with hooks bent on the ends are placed over each rail to serve as further anchors.

Fill the moulds with cement concrete of reasonably strong mixture, say 4 of stone, 2 of sand and one of cement, allowing it to come to the top of the moulds on the side walls (*i.e.*, 4in. or 5in. above the rails) and just level with the rail front and back.

After the concrete is sufficiently set, remove all moulds and plaster the side walls from just below ground level on the outside and from the bottom of the rails inside and over the top. The ends need only be concrete finished when filling the moulds to come level with the top of the front and back rail.

THE POST AND RAILS.

The 4, 6ft. posts should be drilled to take the U clamps for the 1¼in. pipe rail on top, and starting from about 7in. below that with holes to correspond with the 8-wire Cyclone, omitting the bottom wire, which will be cut off, as the concrete above the rails on the side wall takes the place of that wire.

These posts could be built into the walls of the ramp, but I recommend putting them in separately in concrete at the ends of the side walls, so that should they become accidentally damaged they can be replaced without disturbing the ramp walls.

These posts should be set in place at the ends of the ramp with the flanges inwards, and with the crown of the rails flush with outer edge of the side wall, the top about 3ft. 6in. above the level of the ramp rails (this is governed by the last hole for the now 7-wire Cyclone). They can then be concreted in.

If the outer posts of flare are to be of the same type they will be drilled the same as the others and set in the fence line with the flange in the direction of the outer post on the ramp.

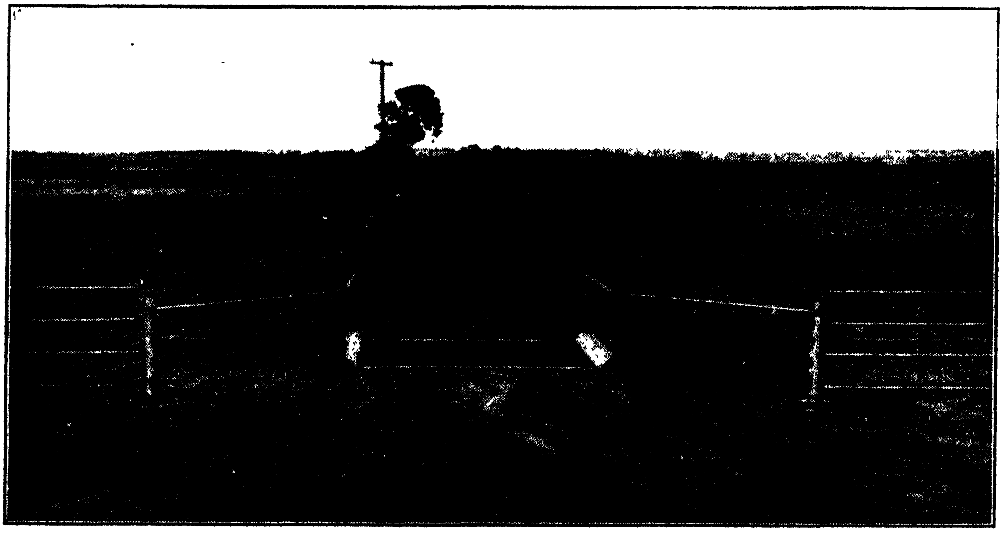
After the whole job is set (allow no traffic for about a week), clamp the 1¼in. pipe rail to the tops of the posts and strain the Cyclone to the two extreme posts and twitch at the middle one.

If there is to be a gate swung to one of the flare posts it is advisable—if using railway iron posts—to make that post a heavier and longer one and set it in concrete.

Also, as that gate will not be used a great deal, put a block against the post against which it slams to take the weight of the gate when closed, as this relieves the gate post of the weight which eventually may cause it to sag.

If running a fence-line from the one or both flare posts, securely strut them, otherwise the strain will eventually pull them out of place.

As you have often to put a gate beside the ramp at the main entrance, I would suggest hanging it on an 80lbs. railway



A 12ft. Ramp, with flare and gates at each side, constructed according to specifications given in this paper.

iron post, which could form the end of the flare. This should be at least 6ft. 6in. long and well set in concrete.

The rails referred to for the ramp should be preferably about 40lbs. rails with reasonably good faces, as torn and splintered crowns are bad for motor tyres.

This ramp may seem unnecessarily solid and strong, but if properly constructed it will carry almost any heavily laden truck without danger of collapse or damage.

Use nothing shorter than 12ft. lengths of rail for a ramp with a turning approach and nothing less than 10ft. lengths on a straight run through. Even if there is plenty of room with these sizes, narrower ramps inspire nervousness on approach.

Ramps between paddocks will be found wonderfully handy to the power farmer, and will save him much loss of time and inconvenience when travelling to and from work with a truck or buckboard.

Yundi School Boys' Potato Competition.

Mr. H. H. Orchard (Horticultural Adviser), reports that for the second year the Yundi Branch of the Agricultural Bureau conducted a potato growing competition for school boys, along somewhat similar lines to the Mount Compass competition established six years ago. Prizes were awarded for the highest yields of market and commercial potatoes grown from 1lb. of seed, and not the total yield of potatoes; in this respect it differed from the older competition.

Thirteen plots were dug on 12th March with the following results:—

Position.	Competitor.	Yield from 1lb. seed.		Percentage marketable.
		Marketable. lbs.	Small and Rejects. lbs.	
1	Douglas Smith ..	314½	56½	84.77
2	Alfred Hill	237½	54	81.47
3	Ross McAlister ..	220½	73½	75.00
4	Clyde Smith . ..	190½	58½	76.50
5	Edward Hill . . .	180	30½	85.51
6	Frank Field . . .	173	29½	—
7	Ronald Hedges ..	169½	98½	—
8	Roger Grist . . .	145½	79½	—
9	Lance Shiers . ..	70½	67½	—
10	A. Skinner	36	23	—
11	Douglas Marshall	33	41½	—
12	Warwick Marshall	32	34	—
13	Robert Marshall .	16	82	—

Douglas Smith has won the competition each year. Twelve months ago he obtained 279lbs. of marketable potatoes representing 86.51 per cent. of the crop. This year's results were obtained from an approximate outlay of 8s. 3d. on bonedust and fowl manure, and the results are equivalent to 12 tons 11cwts. 76lbs. per acre.

The average yield per plot was 140lbs., an increase of 28lbs. over last, and the average number of sets dug was 56.

Roger Grist, with a nice clean, uniform sample gained the prize for the best commercial sample.

Seed for the competition was donated by Messrs. Pitt Bros., of Ashbourne.

Mount Compass Schoolboys Potato Competition

[Won by Linton Jacobs.]

Mr. H. H. Orchard (Horticultural Adviser), who again judged the competition, reports that the Mount Compass Branch of the Agricultural Bureau, conducted a school boys' potato growing competition for the sixth successive year. The same conditions applied as in the previous competitions, that is, each boy was supplied with 1lb. of round seed potatoes (10 in number), and in the presence of stewards appointed by the Branch, had to cut the tubers and plant the sets obtained. No limit was placed on the number of sets and no restriction placed on distance and methods of planting. Digging of the plots was also done under the supervision of the stewards. Messrs. Pitt Bros. of Ashbourne again donated Carmen seed of their own growing.

Previous winners of the competition have been:—

Year.	Winner.	Yield. lbs.
1932	Kelvin Peters	108
1933	Linton Jacobs	217
1934	Don McKinlay	278
1935	Don McKinlay	270
1936	Linton Jacobs	438

Cutting and planting were done on 29th October, 1936; the average number of sets being 75, an increase of 18 over the previous year, and the popular planting distance was 3ft. square. The plots were dug on 11th March, 1937, with the following results:—

Position.	Competitor.	1937 Yield.	1936 Yield.
1	Linton Jacobs	603½	438
2	Kelvin Peters	390	170
3	Don Jacobs	327	294
4	Douglas Chigwidden	300	152
5	Kevin Harris	276½	96½
6	Keith Curnow	249	—
7	Colin Curnow	182	—
8	Brian Simons	143	63
9	Laurie Garden	125½	118½
10	Harry Garden	125	78½
11	Stanley Curnow	121½	—
12	Stanley Hales	71½	—

The highest yield from one set in the recent competition was 13¼lbs., and top growth, which is usually a feature, weighed up to 19lbs. from one set. A marketable tuber was taken from an underground runner 4ft. from the stem of the plant.

The average yield per set of the 5 leading competitors was as follows:—

Competitor.	Sets Dug.	Yield. lbs.	Average Yield per Set. lbs.
Linton Jacobs	100	603½	6.03
Kelvin Peters	80	390	4.87
Douglas Chigwidden .	62	300	4.84
Don Jacobs	70	327	4.67
Kevin Harris	60	276½	4.60

The fertilisers used on the winning plot comprised:—

	s.	d.
5 bags fowl manure	3	4
28lbs. blood and bone, estimated cost	2	9
60lbs. 45 super., estimated cost	2	8
14lbs. sulphate of ammonia, estimated cost	1	7
Total ..	10	4

[Block courtesy "The News."

L. Jacobs, First Prize Highest Yield, 603½lbs. from 1lb. Seed.

From the 121lbs. of seed planted, 2,914½lbs. or 26cwts. of potatoes were dug. The average yields from the plots have shown a steady increase as the following figures disclose:—

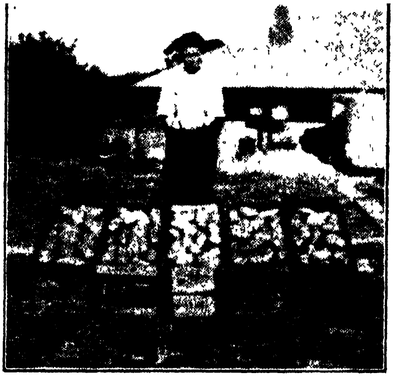
Year.	Number of Competitors.	Total Yield. lbs.	Average Yield per Plot. lbs.
1933	14	1,440½	103
1934	21	3,150½	150
1935	12	2,234	186
1936	11	2,037½	185¼
1937	12	2,914½	243

On the second plot only 35lbs. of blood and bone was used at an estimated cost of 3s. 5d.

The two boys received from Messrs. Pitt Bros., who purchased the potatoes, 24s. and 17s. 6d. respectively.

The tendency amongst some of the boys to strive for a large number of sets and the planting distance of 3ft. square adopted by most of them, tended towards a fairly large plot, and in consequence, when worked out on an acreage basis, the results are somewhat surprising as the following figures show:—

Competitor.	Area of Plot. sq. ft.	Sets Dug.	Yield. lbs.	Yield per acre.		
				T.	c.	lbs.
Harry Garden	130	26	125	18	13	109
Laurie Garden . . .	162	37	125½	15	1	34
Linton Jacobs . .	912¼	100	603½	12	17	33
Douglas Chigwidden	468	62	300	12	9	35



Kelvin Peters with his entry which secured the prize for best marketable potatoes

Credit is due to Harry and Laurie Garden who, unaided, prepared their own plots ready for planting. They used farmyard manure at an estimated cost of 1s. 4d. and 45 super. at a cost of 1s. 9d. on each plot.

Linton Jacobs, when planting, placed the sets in slight hollows and only just covered them, the soil being hoed in as the plants grew. The area was subsequently hoed twice and watered three times by means of sprinklers: the soil was a black peaty swamp. Kelvin Peters used the same piece of land, a grey sandy loam, as he used last year, without any additional organic manure. This plot was hilled and irrigated twice and produced the best marketable tubers.

The prizes presented by Messrs. Pitt Bros. of Ashbourne have therefore been won as follows:—

Linton Jacobs—Highest yield from 1lb. of seed potatoes.

Kelvin Peters—Best marketable potatoes.

Harry Garden—Highest rate per acre yield.

Activities of Women's Branches

Conference of Lower South-East Bureau.

The Coonawarra Women's Branch has every reason to be proud of the success which attended its first effort of holding a Bureau Conference. Approximately 150 women were present on 14th April, the occasion of the Annual Conference of the Branches of the Bureau in the Lower South-East, and delegates attended from Penola, Kalangadoo, Mundalla, Kybybolite, Millicent, and Tantanoola. Members staged a very fine exhibit of handicrafts, which was one of the features of the Conference, and provided luncheon and tea for those who attended.

Mrs. A. Reschke presided and, in addition to the following papers which were read and discussed, Mrs. Hutchesson (Millicent) gave a sock-knitting demonstration, and Miss E. Campbell, of the Education Department, spoke on dressmaking.

Floral Work.

[Mrs. W. A. Clifford, Penola.]

It is first of all necessary to select flowers suitable for the purpose to which they are to be put, or, in show work, suitable for the class in which they are entered. For example, if the class is "Specimen vases," the flowers used must be small and able to be arranged lightly and gracefully; if for a bowl or basket, larger and more striking flowers are needed. Arrangement is of great importance, but even if beautifully arranged, the exhibit will not be successful if the flowers are unsuitable or if the blending of colour has not been carefully considered. Otherwise good work is spoiled through lack of care or taste in this direction, or the use of certain flowers which do not blend well.

At present there is a decided trend in show work to use colour combinations which are new, and in some cases really beautiful. Originality of colour blending and arrangement are always to be aimed at, and any good judge will give points for these, if successfully carried out.

After having selected flowers and colours it is necessary to see that they arrive on the show bench absolutely fresh. Nothing is worse than wilted or bruised flowers, and an entry with any flowers in this condition is almost certain to fail.

The causes of flowers not being in good condition are many. There are flowers which will not stand up to the necessary knocking about, and these must be excluded from the work, no matter how beautiful they may be. Other flowers need care even before picking, so that the yellow stamens will not mark the pure whiteness of the petals, &c. In this respect, those who grow their own flowers have a very real advantage over those who have to procure them from other gardens.

The growing of quantities of stocks, antirrhinums, dahlias, and zinnias is suggested, as these are always useful and stand up well. Other and rarer flowers are also needed, but a lot can be done with those named.

Flowers should be picked early in the morning and put in plenty of water, taking care that the flower heads do not become waterlogged whilst in the water. Later, when they are wired and in the make-ups, a judicious use of the spray pump is of the greatest advantage.

Great care must be used when wiring, otherwise flowers become bruised and very soon totally unfit for exhibition. The flowers must be held firmly, but lightly. This only comes with practice, and at the expense of many wire-pricked fingers. When each make-up is finished, it must be carefully sprayed and put away in a container as nearly airtight as possible. One advantage of this is that quite a deal of work can be done early, and it does not leave everything to be done during the last night or early morning before the show.

The article, when finished, must be suitable for the purpose to which it is to be put. Thus, a bridal sheaf or bouquet must not be so heavy as to become a source of discomfort to the one carrying it, and if the size of the bride is known, it is important to see that the sheaf or bouquet is suitable for her.

Table Decoration.—Table decoration should be judged from the view of people sitting at the table. Nothing is worse than to sit in front of a mass of flowers which hides from view one's *vis-a-vis*. It is also unpleasant to see an unbroken line of stems. In all decorations, the stems should have flowers, leaves, or fern amongst them. This fault is often very noticeable in bowls of Iceland poppies, where there are inches of stems between the bowl and the lower heads.

Finally, the care given to finishing off each article. I have seen handles of bouquets and posies which one would very much dislike to hold, and which would ruin gloves. A little time spent on the thinning out of large handles and the careful wrapping of all would be time well spent.

I have often been asked how to proceed to make a shower bouquet, and I always advise the using of stiff wires cut to one length for a start. Wire on flowers which will be good and suitable for a sort of framework for the bouquet, bind these firmly into a bundle, then spread them out to form a circle, bending them slightly forward. These can be pulled into place and a well-shaped bouquet assured. I always like one beautiful flower for the centre. This is not usually put in at first, for fear of damage, but the wire can be included in the first bundle and the choice bloom added later. After the framework is secured, shorter wired flowers can be worked in, also fern and leaves, until it is completed.

Sheafs and wreathes are made in rather a similar manner. The same frame is used in each case, except that in the case of the wreath, the frame is confined to a circle. This must be firm and the flowers well fixed with wooden tooth picks to withstand the handling and jolting to which these are of necessity subjected.

Jelly and Jam Making.

[Mrs. Fred Darwent, Coonawarra.]

One of the most important things in making jelly is to get the fruit at the right stage. Half-ripe fruit is necessary to make good jelly. The proportion of sugar is generally 1 cup to 1 cup of liquid. Boil juice for 10 to 15 minutes. Add sugar and boil quickly from 10 to 20 minutes, when it should be tested by putting a little on a saucer. Remove all scum carefully. The bag for straining jelly should be made of flannel. Any strong material with a close weave answers almost as well. Before straining jelly, the bag should be wrung out with clean, hot water. The last of the liquid should be allowed to drip slowly through the bag unaided by pressure. To strain small quantities of jelly, reverse a chair and place the seat flat on the table, tie cloth to the four legs, and place bowl under cloth.

Recipes.

Apple Jelly.—Take as many apples as required, windfalls will do, and small ones are the best. Place in a preserving pan with enough water to cover them; when boiled to a pulp, do not stir, strain through a jelly bag, and to every breakfast cup of juice add three-quarters cup of sugar. Boil briskly until it jellies, and pour into jars. Exclude air from jars either by covering with paraffin wax or paper moistened by being laid on a saucer of milk before being applied to jar.

Lemon Jelly.—4lbs. of lemons cut in slices in 4 quarts of water. Let stand all night. Boil for half an hour. Stand until next day, strain through flannel. A cup of sugar to a cup of juice. Boil from 20 to 30 minutes.

Quince Jelly.—6lbs. quinces, 5 pints of water, sugar. Wash fruit and cut in small pieces. Put in pan with water and stew slowly, mashing from time to time until fruit becomes tender. Strain through jelly cloth. Boil liquid 20 minutes. Add equal amount of sugar. Boil briskly for 10 minutes.

Jam Making.

Always choose good fruit in making jam. Over-ripe fruit seldom produces good jam. When leaving fruit to stand over night, sprinkle with sugar. Use an enamel or earthenware vessel; aluminium and fruit acids affect one another. Do not overcrowd the preserving pan, allow plenty of room in the pan for the jam to boil and rise, if necessary.

When sugar is added, it should be quite dissolved before the jam boils. The longer the jam is boiled the better it will keep. When cooking jam with little or no water added, stir often and thoroughly from the bottom of the pan to ensure it not sticking. Jam generally should be boiled fast to keep a good colour. No definite time can be laid down for the cooking, as the fruit and rate of boiling vary in each case. It is a matter of choice whether the bottles are sealed whilst hot or cold. When covered with paraffin wax they are better done when the jam is cold, otherwise the wax will not adhere to the sides of the bottles, which is necessary to make them airtight. There are inexpensive cellophane and gummed covers on the market to-day, which make the sealing of jam an easy task. Jam should be stored in an airy cupboard, but it should be cool, dry, and dark.

Recipes.

Fig Jam.—To every 1lb. of figs allow 1 cup water and 1lb. sugar. Boil water and sugar first; as soon as sugar is melted put peeled figs in and boil together until thick. Add few almonds and ginger to taste.

Banana and Pear Jam.—12 bananas, 4lbs. juicy pears, juice of 4 lemons, 6lbs. sugar. Put 2lbs. sugar in preserving pan, squeeze over the lemon juice and allow it to dissolve. Peel, core, and cut up the pears, add to sugar, bring to the boil, add rest of sugar and the bananas cut up small. Stir until it boils, simmer five minutes. Skim and boil fast for an hour or until it jellies.

Grape Jam.—4lbs. grapes, 3lbs. sugar; wash grapes and strip from stalks, place in pan and crush slightly. Bring slowly to the boil. Boil fruit half an hour, add sugar, and stir until dissolved. Boil fast until jam sets. Seeds can be removed as they float to the top.

Pickles, Sauces, and Chutneys.

[Mrs. RESCHKE, Coonawarra.]

To have one's pantry well replenished with pickles, sauces, and chutneys, as well as jams, jellies, and preserves, is indeed most helpful to the household menu, and the industrious housewife who provides well for the family's requirements, and does not like to see waste in the vegetable and fruit garden at the time of the year each is in season, will see that the pantry shelves are well filled for use in the winter, when these wholesome and much appreciated goods are not available. Good vinegar is essential, and should always be used in preference to poor vinegar, as the vinegar is the main preservative.

The pickles in which the flavour of vinegar predominates are usually spoken of as "sour pickles," and when the sugar or sweetness is more prominent, they are called "sweet pickles" or "spiced fruit". They are all excellent preserves, and usuable in several ways. Mustard pickle is also a favourite, and chutney is well worthy of consideration. Tomato sauce and "relish" are also great favourites, and appreciated by most who can partake of condiments and vinegar. Liquid sauces include mushroom ketchup, Worcester, and those made from herbs, such as mint, etc. Almost all vegetables can be made into pickles, and many fruits; also olives and nuts.

Metal utensils should be avoided in pickle making. A good enamel preserving pan is much better for the purpose, and a wooden stirring stick. Clean glass sterilized bottles, or earthenware jars, which can be well corked and sealed, are suitable for the purpose of storing the finish product, and paraffin wax, which is clean and easily removed, can be used to keep the bottles and jars perfectly airtight.

Samples of pickles, &c., were exhibited by Mrs. Reschke.

Spinning.

[Mrs. W. C. JOHNSTON, Kybybolite.]

Spinning is the oldest of women's handicrafts, and goes back into the dim and distant past. The first appliance for this work was the hands, when the fibres were rolled in the hand until a type of cord was made; next came the distaff, and all ancient cloth was woven with yarns spun with a distaff. The distaff was recognised as the symbol of womanhood, and it is from this ancient association that the female side of the family has become known as the distaff side. The distaff was a wooden stick, about 3ft. long, and upon it was wound the wool or flax to be spun into yarn. This was done by twining the stick in such a manner so that it gave the necessary twist to the thread, which was then wound into a ball.

THE SPINNING WHEEL.

The distaff was the only means of spinning until the spinning wheel was invented. When this was is not quite certain, but it was in general use until after 1764, when John Hargreaves made the first spinning jenny. This had the advantage of one person being able, to spin a number of threads at a time, which revolutionised commercial spinning.

In European countries the peasant women still spin their own yarns, keeping a few sheep for that purpose. After spinning their wool, they weave their own cloth, using a very primitive type of table loom. It is then dyed black, made into clothing, and lasts for years. Asiatic women are often seen spinning with a distaff, carrying it in their hands as they go on their lawful occasions.

Care should be taken in the selection of wool for spinning, as a very fine wool has a much greater felting power, and will not stand up to too much washing. A comeback type of wool, or fine crossbred of about 58s to 60s count, is a very useful wool for jumpers, while a half-bred Merino-English Leicester makes a yarn that will stand very hard wear. It is easy to spin, and much easier to start with than a finer wool.

Spin the wool straight from the fleece; never wash it before spinning. It should first of all be combed free from grass seeds, second cuts, &c. Use a strong hair comb or the worn comb of a shearing machine. Always handle wool very carefully, breaking the fleece up into its locks. By holding each lock firmly in the left hand and combing away from the body, the work can be done easily and thoroughly. It will be found necessary to comb both ends of the staple, combing the weathered end first. In this way all the fibres are brought to lie in the same direction, which is necessary for a good even yarn.

Washing and Drying.

After the wool is spun it is skeined, and is then ready for washing, which is done in hot, soapy water. Never rub the wool, but keep the water in the vessel moving, and lift the wool in and out of the water. Leave wool in for about a quarter of an hour. Repeat until the wool is clean, and rinse in hot, clean water, always using water of an even temperature. Anything from 110 to 120 degrees will do. Hang wool out to dry.

Dyeing.

After drying, it is ready to be knitted or dyed. For vegetable dyeing it is first necessary to mordant the wool, which is done by boiling the wool in a mordant made of 4ozs. of powdered alum and 1oz. of cream of tartar. Dissolve alum and cream of tartar in sufficient water to allow 1lb. of wool to open up evenly; always use an enamel vessel. Bring slowly to the boil; boil for 1 hour; leave overnight; Wring out tightly, put in a calico bag, and hang in the cellar for a few days, when it will be ready for dyeing. There are many lovely colours to be had from our native plants. When testing a plant or bulb for colour, boil a specimen in an enamel dish, let it cool. Take out plant and put in a small piece of wool to try the colour. Always boil the wool a shade darker than desired, as when dry it is lighter than in its wet condition. It does not hurt to boil wool, provided it is brought to the boil gradually. It is the sudden change of temperature that harms it.

Bringing Up Children.

[Mrs. M. Hutchesson, Millicent.]

Expectant mothers should live for the child before it is born by taking proper exercise and food; also avoiding overtiredness and worry, so far as possible. The more she can keep calm and happy, the better for the child.

In the olden days mothers often suffered tortures of fear in case of some unfortunate experience, such as the sight of a mouse or a longing for some curious article of diet, should have an adverse effect on the child. These ideas can be dismissed at once. The child will not have a birthmark, in the shape of a mouse or strawberry, because you were frightened by one or longed for the other. No mother should allow herself to be afraid for the child. The young mother need not worry or be disappointed if her child is not beautiful at first. Very few babies are born beautiful, but after a few days it will be possible to tell how they will be, whom they will resemble, and what features they will have.

Babies are born with a very soft skin, and when washing and drying baby the skin should never be rubbed. Touch the skin gently, gliding over it with soap, and afterwards rinse by squeezing water over it from the face washer. When taken out of the bath, rest on a soft towel, also using a soft towel for drying. The general action should not be one of rubbing, but of patting. Powder is not necessary; very little, if any, should be sprinkled on baby.

Babies should be very gradually accustomed to strong light, and their cots shaded from artificial light. If a baby has long hair, use only a soft brush and treat the head very gently until the gap in the skull is closed.

Feeding.

Mothers should, if possible, breast feed their children for the first nine months, and let them live in the fresh air and sunshine as much as possible. If a mother is forced to artificially feed her infant she should see that the food contains those subtle elements which may be destroyed when milk is diluted or boiled. Fruit juice should always be given to artificially fed babies. When the progress of the child is slow, and backward in cutting its teeth, a broth made of mutton bones boiled in water, to which a little vinegar has been added, will give a supply of calcium, and should be given in small quantities, in addition to the ordinary diet.

Baby should be early trained to good and clean habits, and let lie in the sunshine quietly for the first 12 months of life. It is not at all necessary for them to be pushed out in a perambulator, they will do well if let lie in the open air. The young baby should sleep from 20 to 23 hours out of the 24 hours. As he grows older, his need for sleep will lessen. When cross and fretful and cannot sleep, it is a good idea to hold him with his face pressed to yours and sing to him in a low, crooning voice. Such treatment will ofen put them to sleep.

Generally speaking, the more children are allowed to play in the open air, the healthier they become. People who live in cities should try to get their children away to the country from time to time, and let the playground be some park or open space. It has been proved that exercise out of doors is twice as beneficial as exercise indoors. They should, therefore, be encouraged in such games as running, jumping, climbing, ball throwing, &c. Teach the child to clean his teeth night and morning. Show the child how to do this, and gradually allow him to take over the business himself.

Children will often become faddy and difficult over food because of too much pressing. It should be remembered that children should never be urged to eat certain sorts of food because they are "good" for them. If a child has a poor appetite, never call attention to this by remarks such as, "Oh, dear, he has eaten nothing." "Have just a little more to please Mummy." The child in this way becomes the centre of interest, and unconsciously forms a habit of eating little so as to hold the attention of the grown-up.

In attending to the needs of the body, do not neglect the minds of the children. Hold up an ideal and praise them when they attain it, rather than scold them when they fail. It is better to say, when the law has been broken, "I am surprised you have been so rude, you are really such a polite little child," rather than to exclaim, "You naughty child to be so rude."

A child should learn independence early. One of the great secrets of training is for the child to learn "to leave it alone." He should learn self-reliance by attending to his own needs as much as possible. He should wash, dress, and feed himself from an early age. Treat him as much as possible as if he were an intelligent member of the family circle. Allow him to build with bricks, make sand castles, mud pies, etc. It is not expensive toys that are necessary, but freedom to create and imagine. The best future lies before those children who are left free to create a rich world of imagination.

Much is done by taking an interest in the children.

A Few Hints on Fern Growing.

[Mrs. C. T. Trezise, Mundalla.]

The first important factor is the preparation and drainage of the soil, without a knowledge of which ferns cannot be grown successfully. At times one hears folk say, "I simply put them in the ground and they grow." Well, how much better results we would achieve if a little more time and consideration were given to the preparation of the soil. Ferns require very light soil, the best compost is a rich sandy loam and peat; wood heap earth is also hard to beat; it is as good as most fern soil, and is easy to obtain.

The time for repotting all ferns is early in spring, and good results are obtained by mixing leaf mould and thoroughly pulverised cow manure with the soil, the results being well worth the work entailed. For drainage only cow manure is sometimes used at the bottom of tubs, pots, etc. This, of course, is not of much use in small pots, as the manure is left in large pieces. In such cases, charcoal makes a good substitute. Diluted cow manure is one of the very best fertilisers for ferns; also liquid weak sulphate of ammonia used, say, ¼oz. to 1gall. of water, if applied daily in spring when the ferns are about to break into fresh growth. All ferns require a fair amount of moisture, especially in summer, when the soil should always be kept damp (say, watering daily), while in the milder period of the year twice a week will be found sufficient—otherwise very little attention is required.

Hardy outdoor ferns give excellent results in any shady, sheltered position, again provided the plants receive a plentiful supply of water. Whilst indoor ferns require plenty of light and air, they will not thrive in a draughty place or when exposed to direct sunlight. Ferns do not seem to keep their condition during winter, but soon revive again after being repotted in spring. Always be careful not to use strong fertilisers, otherwise they may burn or injure the plants. When cutting back maidenhair fern, try singeing the ends with a taper, for in a very short time this encourages new, healthy growth.

Women's Bureaux at Koolunga.

Mrs. S. Perrin presided over a large attendance of delegates at the Mid-North Conference at Koolunga on 11th March Members of the local Branch staged a very attractive exhibit of needlework, handicrafts, preserved fruits, vegetables, &c The following papers were read:—

Nature's Remedies.

[Mrs. M. Reynolds, Narridy.]

These include sunshine, fresh air and water. The sun is the greatest source of energy in the world. Because of its beneficial influence upon the earth, plant. animal and human life are made possible. The sun warms the air and the earth. Sunshine is a marvellous wealth and healing power. While sunshine is death to disease-producing agencies, it is life and health to all natural forms of life. The sun's rays are destruction to all germs in a few hours when exposed directly. Even the germs in tubercular sputa are destroyed in a day or two when exposed to sunshine. The energy of the sun as manifested in plant life is marvellous. It is the genial rays of the sun that call forth the sleeping plants and seeds in spring, and also the sown wheat, oats, corn and other cereals, cracking the crust of the earth and lifting these tiny blades into the air.

Sunlight has a vitalising power upon plant life, and uniting with carbon, hydrogen and oxygen, is stored in the form of potential energy for future service. On analysis, it is shown that a sunbeam contains heat rays, chemical rays and light rays. Heat rays are the means by which the earth is warmed, light rays flood the earth with light, and chemical rays give the grass its green and tint the flowers and fruits with their peculiar and rare colours. It is the chemical rays that cause the skin to tan. These rays are a vital energiser to the nervous system of men and animals, and are absolutely essential to life. Without sunlight, plants are sickly and fail to develop the green colouring matter; without sunshine, man is pale, sickly anaemic, as are the plants, and the blood lacks colouring matter.

During the last few years the X-ray and the Finsen light have been discovered, both of which are now being used extensively in the treatment of malignant tumors and skin diseases. All the properties of these lights are in sunlight. It is perfectly evident from these discoveries that sunlight is a powerful healing and remedial agent. Skin diseases and malignant diseases are much less common amongst those who spend a large share of their time in the open air, exposed to light. If the entire body could be daily exposed to sunlight—as is the face—man would be far healthier and happier. Light promotes health; darkness, disease. A sunbath should be taken daily; especially is this necessary with tuberculosis, when the body or chest, or the part diseased, should be exposed. Such treatment will help cure disease, or prevent it altogether if the sun's value is appreciated. Those who spend most of their time in poorly lighted rooms, lack colour, energy, vigour and cheerfulness. Sunlight calms the nerves, relaxes the blood vessels and restores depleted vital energies. It drives away despondency, and is a wonderful sleep restorer. It is Heaven's free gift to man, can be had for the taking, and is Nature's most potent healing remedy. Sit in the sun, recline in the sun, walk on the sunny side of the street, avoid umbrellas, and recognise the sun as a friend—not an enemy—a promoter of health, and a destroyer of disease.

Fresh Air.

The freshest air is inseparably associated with sunshine. The air is purified by the sun, the rain and the breeze. The sun is destruction to germ life, the rain precipitates all impurities to the earth—in other words, bathes the air. The breeze keeps it in motion, which is absolutely essential to pure, fresh air. In the living room and in the sick room, every possible provision should be made for abundance of fresh air as well as light. Air is food to the blood tissues as are bread, wheat or corn. Breathing impure air quickly lowers vital resistance and causes anaemia. Deep breathing, the result of working or exercising in the open air, is absolutely essential to health and vitality.

WATER.

Water is the most widely distributed element in Nature; it is always to be found near at hand. It is inexpensive and can be used successfully in the treatment of more diseases than any other remedy. It is well known that washing the face with cold water is wonderfully refreshing and restful. The cold to the face excites the nerve endings of the tri-facial nerve, which in turn reflexly contracts the cerebral blood vessels and increases the venous flow from the brain. It follows that if one may be refreshened by bathing the face with cold water, a much greater effect can be obtained by a proper general application.

Any application to the body at the temperature of the skin is neutral in effect, and then it is neither exciting nor depressing. Water is used in many ways in the treatment of acute and chronic disease, by baths, simple sponging, hot and cold compresses, wet packs and fomentation. Water drinking is an instinctive demand of the body, yet it is true that people as a rule do not drink sufficient water. An adult should drink from 3 to 6 pints of water daily. A little fruit juice added may make it more desirable. It is better to take it in small quantities than to deluge the stomach with a large quantity, especially directly following a meal. Iced water drinking should be avoided, especially if one is perspiring or exhausted. Cold water is just as refreshing to the stomach as it is for the face. Water should be given freely to infants and children. A few teaspoonsful of warm water given to a young infant 2 or 3 times a day (even though it objects) will encourage the formation of an excellent habit. The crying from very young infants is frequently caused from thirst, and not hunger.

Marketing Hints.

[MRS. H. SIVIOUR, Narridy.]

Choice of foodstuffs calls for almost as much skill as cooking. Here are a few points to bear in mind when buying:—*Apples*: Split the stem. If it is soft and sappy, it is a fresh apple. *Bacon*: Have it cut thinly. It cooks better, tastes better, and is more economical. If cut too thinly, it will break. *Cabbage*: Young and tender cabbage has closely packed leaves and only a slight odour. Watch for splits. They indicate worms at the centre. *Carrots and parsnips*: Should be firm, and the crown at the base of the leaf stems small. If the crown has spread, the vegetable is overgrown and probably tough. *Cauliflower*: The flower should be tightly packed and white. When it has spread, another and unsavoury growth has begun. *Coffee*: The crack in the bean should be almost invisible. If widely spread, the flavour and aroma will be diminished. *Eggs*: A fresh egg should feel heavy, and when held to a bright light shows no dark specks. It will sink in a saucepan of water; a bad or cracked egg will float. *Fish*: A fresh fish must be stiff, and not in the least flabby, the eyes must not be sunken, the gills should be red, and the skin smooth and moist. *Fowl*: A young and tender fowl is soft to the touch at breast bone and second leg joint. If those places feel tough, the fowl is old. *Grape fruit*: Those with unblemished skins are most desirable. If there are black spots where the fruit was attached to the stem, beware. *Lettuce*: Should be firm and crisp. If it has been plunged in water to revive it, the inside will be soft. *Meat*: Mutton is a paler colour than beef. The flesh should be elastic, not flabby and watery. The fat should be well mixed with the lean *Melons*: Fragrance is a fairly sound test, but the only way to be sure of quality is to open and test. *Oysters*: Rap the shells together. If they sound like stones, the inhabitants are alive and edible. *Parsley*: If fresh, it will be fragrant. *Peaches*: Take those which are fragrant. Peaches with beautiful skins and no odour are usually tasteless. *Peas*: Press fingernail into pod. If sap does not appear in the wound, the peas are not fresh. *Radishes*: The centre leaves should be small and the flesh crisp. *Spinach*: Curved leaves mean over-growth. *String Beans*: Avoid those of anaemic pallor. *Sweet potatoes*: Select those with smooth skins. If there are little rootlets attached, the sweet potato will be fibrous and unpalatable. *Turnips*: Test with finger nail. If incision does not fill with liquid, the turnip will be stringy.

The Problem of Nutrition.

[MRS. E. A. KLINGNER, Narridy.]

What shall we eat? What shall we drink? These questions arise constantly in the mind of the perplexed housewife, upon whose ingenuity in the selecting and cooking of food, the happiness and the health of the family largely depend.

Life is maintained through the air we breathe, the water we drink and the food we eat. Some part of the various tissues of the body are continually being impaired or broken down and only by introducing into our diet certain food elements, can these tissues be satisfactorily renewed.

FOOD ELEMENTS.

Food elements are as follows:—(1) Proteins ; (2) carbohydrates; (3) fats (4) inorganic salts. In addition there are certain food accessories known as vitamins.

Proteins.—Eggs, cheese, milk, nuts, and legumes are very rich in protein and much may be said in favour of these articles of nutrition as substitutes for flesh. They contain the same food value as meat, without the poisonous constituents of the latter.

Carbohydrates.—These are made up of chemical elements, carbon, hydrogen and oxygen. Starch is found in all cereals, nuts, many vegetables and in some fruits. Carbohydrates serve as the chief source of heat and energy and make up about 60 per cent. of the total number of calories of diet; 2oz. or a little less daily is considered necessary for a person weighing 150lbs.

Fats.—The vegetable kingdom produces many foods containing fats, such as oatmeal (6 per cent.), peanuts (21 per cent.), corn (4 per cent.), and cocoanuts (68 per cent). The animal kingdom produces food substances as follows:—Cheese (30 per cent.), eggs (11 per cent.), butter (80 per cent.), cows' milk (21 per cent.). The purpose of the fat in the body is to yield heat and energy. The fat reserve acts as a protection and gives shape and symmetry to the body.

Inorganic Salts.—These are very essential to the body. Chemically they consist of magnesium, phosphorus, sodium, potash, sulphur, lime, iron, &c. Our best supplies are obtained from fruit, grain and vegetables, hence the necessity for allowing such foods to have an important place in our diet. These salts are a valuable help to the red blood cells and various tissues.

VITAMINS.

It is only in recent decades that the existence and great importance of the vitamins have been realised. Unless the diet contains a sufficiency of vitamins, the health is sure to suffer in some way. Vitamins are chiefly as follows:—

Vitamin A is necessary to produce growth and to prevent blindness. Proper nutrition and vigor cannot be maintained without it. This vitamin is not destroyed by cooking or canning. It is found chiefly in fresh spinach, lettuce and other greens, butter, egg yolk, carrots, potatoes, tomatoes, fresh or canned, bananas, apples, orange juice and fresh milk.

Vitamin B is a preventive of beri-beri. It is destroyed by alkalis, but not by cooking. Its absence from the diet causes loss of appetite, constipation, poor and insufficient milk in the mother during lactation, and other disorders. It is found chiefly in whole grains and in the germ of cereals, in bran, nuts, legumes, vegetables, fruits, egg yolk, milk, yeast and very richly in marmite, &c. White bread is sadly deficient in this vitamin, but wheat meal bread and granose are rich in it.

Vitamin C is a preventive of scurvy. It is easily destroyed by cooking and drying. Faulty nutrition, poor quality of the blood, a tendency to haemorrhage, rapid heart action, scurvy and tooth decay are among the baneful results where this vitamin is deficient. It is found chiefly in uncooked foods, such as tomatoes, oranges and lemons, raw vegetables such as, and especially, cabbage, lettuce, celery, spinach and carrots.

Vitamin D prevents rickets. It is necessary for the metabolism of lime and phosphorus in the body. It is not destroyed by cooking. Rickets, bone deformity and decreased resistance to infection follow a deficiency in this vitamin. It is found chiefly in egg yolk, spinach and other greens grown in sunshine, and in milk, cream and butter from cows that are fed on sunny pastures. It is also found in foods—particularly oils—irradiated with ultra violet ray, and further, it is produced in the body by sun bathing and treatment by ultra violet rays.

Vitamin E is necessary for iron metabolism. It is found in association with vegetable oils and is not destroyed by cooking. A deficiency of this vitamin results in sterility and anaemia. It is found chiefly in wheat germ, maize, oats, cotton seed oil, cocoanut oil, and egg yolk.

HINTS ON DIET AND FOOD COMBINATION.

To nourish the body properly, the food (1) must contain all the elements of nutrition; (2) be skilfully cooked or prepared; (3) must be properly masticated; and (4) it must not be eaten in the wrong combination, which may disturb or delay digestion, lead to the development of poisons in the alimentary canal and consequently disease.

The following are wise rules which, if followed, will help in the prevention of stomach troubles and make for healthy digestion:—

(1) Avoid drinking cold water and other cold drinks with full meals. If such drinks must be used, use them sparingly.

(2) Avoid, except in illness, too many soft foods that require no mastication.

(3) Avoid milk and sugar in large amounts at the same meal. They are a bad combination. It is best not to use white cane sugar with porridge when milk is used. Dried fruits, as raisins, dates, figs or malted wheat extract, and honey or treacle, will take the place of sugar.

(4) Milk, sugar and eggs make a still worse combination, as the disturbance caused by the fermentation of milk and sugar prevents digestion of the protein in the egg, which decomposes and poisons the system.

(5) Only one of the principal foods at a meal should be a rich protein food. Foods rich in protein are legumes, such as dried peas, beans and lentils, nuts and nut foods, milk, eggs, cheese and flesh foods.

(6) Milk and meat together are not good, as both are highly nitrogenous foods. Moreover, the meat evokes a highly acid gastric juice in the stomach, and this acting on the milk produces hard, indigestible curds, which remain long in the stomach.

(7) Acid fruits and large quantities of milk are also bad. It may be partaken of slowly, thus allowing the saliva to mix with each spoonful.

(8) Fresh raw fruits and fresh raw salad vegetables such as lettuce, celery and grated carrots, may be used at the same meal by the majority of people but any raw fruits with coarse cooked vegetables form a bad combination. Acid fruits are as follows:—Apricots, blackberries, cranberries, currants, gooseberries, grape fruit, loganberry, oranges, lemons, peaches, pineapples, plums and sour apples. Coarse vegetables are beet, cabbage, carrots, cauliflower, celery, onions, parsnips, radishes, spinach, swede, turnips. Never use acid fruits and coarse cooked vegetables at the same meal. Non-acid fruits may be used at the same meal as the finer cooked vegetables, but the very best combination would demand that no fruits should be used at the same meal as cooked vegetables.

Non-acid and sub-acid fruits.—Bananas, dates, figs, pears, prunes, raisins, sweet apples, sweet grapes.

Fine Vegetables.—Asparagus, brussels sprouts, cucumber, lettuce, peas, sweet corn, sweet and Irish potatoes, tomatoes. The following foods may be eaten with either fruits or vegetables by the average person. Beans, green or ripe, cottage cheese, egg-plant, eggs, grains (any of them—oats, rice, wheat, etc.) macaroni, sago, tapioca, vermicelli, mushrooms, pumpkin, spaghetti, musk melon, nuts, olives and tomatoes and noodles.

Rhubarb.—On account of the oxalic acid it contains, should be omitted from the dietary.

Some people cannot take starch foods and acid foods at the same meal.

Laxative foods are.—Asparagus, beet, greens, buttermilk, carrots, cauliflowers, figs, Irish potatoes, fresh fruits, malt, honey, malted milk, nuts, olives, olive oil, prunes, spinach, stewed raisins, tomatoes, also san-bran and wholemeal food.

Constipating food.—Corn starch, flesh foods, milk, most gruels, rice, white bread and white flour products.

The Value of Green Leaf Vegetables.

[Mrs. F. A. POWELL, Koolunga.]

Leafy vegetables are valuable for their minerals, especially iron, vitamins A, C, and G, and roughage. Thin leaves are more valuable than thick, green than pale, and raw ones than cooked. Leafy vegetables are low in starch and sugar, therefore they are ideal for the diabetic. Being also low in fat, they are a valuable asset to those who wish to reduce weight. The protein in leafy vegetables is of high value, but low in amount, thus they may be used freely without danger of too much protein. All leafy vegetables are alkaline in reaction. They are good sources of calcium, being the original source of, and the best substitute for, the calcium of milk. Leafy vegetables are among our best sources of iron. They also contain some copper, which is necessary for the utilisation of iron. Thus, with their copper content and high percentage of iron, all leafy vegetables are important in preventing anaemia, due to deficient diet or haemorrhage. All leafy vegetables having colour, are rich in vitamin A. Spinach and lettuce are among the leading of all foods tested for this vitamin.

All leafy vegetables, especially spinach and turnip greens, are fairly good sources of vitamin B—the vitamin which protects and nourishes the nerves, increases the appetite and promotes digestion. The leafy vegetables are also rich in vitamin C if eaten raw, especially spinach, and raw cabbage is a most excellent source of this vitamin, because it lends itself readily to being eaten in large amounts uncooked. Lettuce, even though uncooked, is low in vitamin C.

All leaves are valuable sources of vitamin G, and this is not destroyed by heat unless soda is used. A list of the common leafy vegetables is as follows:—Beet tops, brussels sprouts, cabbage, chard, chicory, endive, escarole, kale, lettuce, mustard, parsley, spinach, turnip top and water cress. There are also many so-called weeds which have edible leaves. With this array of available greens, everyone should be able to procure an abundance of these valuable foods. A generous amount of some leafy vegetable should be included in the diet daily. Spinach should appear most often—about 3 or 4 times a week. Most people would profit by the generous use of leafy vegetables. Cooked spinach can be digested by very weak stomachs, and raw, finely chopped cabbage can be taken when cooked cabbage cannot, and for others who cannot take it chopped, in powdered form or juices, it can be used for the sick, in making broths and soups, and proves very beneficial. Cook leafy vegetables in the least possible amount of water. Use a lightly covered dish to assist in conserving the vitamins; cook quickly, as there is less loss of vitamin in rapid cooking. Do not use soda.

The Medicine Chest.

[Mrs. E. D. WHITEHORN, Koolunga.]

A woman, especially in the country, is called upon to play many parts, especially in sickness and in the case of accident. It is usually mother who is needed when things go wrong. Added to her many household duties is the job of nurse, and often doctor at these unhappy times. Mothers living in the city are fortunately, in most cases, able to get the doctor's or district nurse's attention in a very short while. Remedies from the chemist or articles needed for sickness or accident are obtainable in a very short while. It is often said that a little learning is a dangerous thing, but a little knowledge of what to do in sickness and of first aid in the home is far better than none.

A plain medicine chest, full of useful remedies, is not to be put aside for an expensive-looking article, full of useless things in emergencies. Medicine chests should be made of a fair sized box or tin, with doors or lid attached, with a strong lock and key, to be kept well away, but in a handy place to be found in a hurry, as children have a way of just looking to see what is in that tin or box. So many of these necessary items are deadly poison, and one cannot be too careful. The chest must always be kept in a good light, and all poisons marked with red or coloured labels, to ensure the fact that they are not used in mistake. When in a hurry to use something, many tragedies occur, through no definite poison label or mark being attached.

Buy the purest ingredients for the first aid outfit; also buy the best instruments. The most necessary of these is a thermometer, and then an enema syringe or douche can, a good pair of tweezers or forceps, an eye bath, a long darning needle for splinters, a pair of surgical scissors, a glass and rubber eye dropper for measuring drops, or for putting drops into the eyes, ears or nose. A roll of adhesive tape or plaster is indispensable for strapping up cuts on fingers or the face, or any part where it is hard to keep a bandage. Also in cases of a baby's navel protruding, by placing a strip across the abdomen and keeping it firmly in position. A roll of cotton wool kept in a piece of well-boiled linen. Bandages and swabs and pads of various sizes can be made from old linen, well boiled and dried in a hot oven or in the sun, and packed straight into a sterilised tin or jar and kept dustproof. A packet of sterile gauze or lint can be procured from the chemist. A piece of oiled silk or waterproof 6in. to 8in. square is invaluable for keeping the heat in a foment or plaster. A bundle of safety pins is also a necessity, also a good sized triangular bandage for using as a sling. Boracic acid is a good dusting powder or deodorant, or for use as a lotion for bathing the eyes, &c. (strength, 1 teaspoon to a pint of water). Iodine is used to allay deep inflammation, or a counter irritant for sprains; also a good remedy for ring worms.

Condy's crystals (permanganate of potash) to make an antiseptic lotion for infected sores, cuts, gravel rash, abscesses or other injuries, to use as a bath or wash for the infected part. Coloured a deep pink, it makes an excellent bath for sore feet; also another thing for people who suffer with aching feet is boracic acid sprinkled in the stocking between the toes. Hydrogen of peroxide should never be left out. It is advisable, if buying a large bottle, to keep in a dark place to ensure it retaining its strength. It can be used as a mouth wash or gargle for sore throats, or swabbing out a baby's mouth that has thrush. (Strength for this, 1 in 20), as a small baby's mouth is very sensitive. Its use for swabbing pus sores (2 in 10) is excellent. A drop in the ear will loosen wax or foreign matter, but on no account, if putting in children's ears, should anyone try to poke at the offending article. Either take the patient to, or send for the doctor immediately. The same applies to the eyes or nose. Use in proportion 1 in 3. Friars Balsam (compound tincture of benzine) has also many uses. Apply to cuts, or cases of a mother with sore nipples when nursing, as an inhalant for sore throats, colds in the head, and bronchitis. Is is especially effective in cases of croup; use 1 teaspoon in a pint of hot water in a jug or steaming kettle.

Tannic acid is a wonderful cure for burns. It should be bought in small quantities (say 2ozs. at a time) and made fresh when needed (1 teaspoon dissolved in 4ozs. or 8 tablespoons of cold water). Soak sterile gauze or linen in mixture, and apply to wounds. Picric acid (1½ level teaspoons to a pint of water) or Carron oil are also effective. Carron oil, ready mixed, is useful in the kitchen at all times. In cases of burnt fingers, or scalds, oils of all kinds are most useful. Olive oil is a mild lubricant if children like it instead of paraffin or Nujol. Camphorated oil is used for rubbing children's chests, and cleaning out their nostrils, and is also effective as a liniment in cases of rheumatism or for allaying pain of a bad bruise. Castor oil should be always at hand too. It is invaluable for stopping dysentery and stomach ache in children, except in cases of constipation, when a dose of paraffin or olive oil should be given. A drop of castor oil in eye will often remove a foreign body. Mixed with boracic acid and applied to a chafed baby, it cannot be beaten. Vaseline is also invaluable in a dozen or more ways, some of the most important being cradle-cap, prevention of chafing or scalding in babies, added to boracic acid and making boracic ointment for applying to burns with carbonate of soda.

Methylated spirits, of course, is needed for cold compresses over bruises or sprains, on the forehead for headache and for rubbing the back and heels of a patient to prevent bed sores. Salts, either Glauber or Epsom, are useful aperients. Make up in a bottle with lemon and sugar or licorice (quantities, 4 packets salts to 1 stick of licorice). Dose—1 wineglass in morning. Aspirin of some form should always be kept, but only use Phenacetin for a baby. A tin or jar of Antiphlogestine is also useful for congestion of the lungs, or for an obstinate splinter or for any inward inflammation. Bates's salve for boils or festers, or in the case of an obstinate boil, Epsom salts mixed to a paste with glycerine is most effective. Glycerine is one of the many oils not to be left out. A few drops warmed and slowly dropped in the ear is a sure cure for earache. Calomel tablets are always in demand where there are small children (½ grain for a small child up to 7 or 8 years of age). Give a purge for all inflammatory conditions of the stomach.

Ipecachuana wine is used as an emetic in cases of children swallowing articles or drinking from bottles. In cases of croup 1 dessertspoon methylated spirits, 2 dessertspoons vinegar, 3 dessertspoons water; soak a flannel and wrap around the throat, cover with a dry strip. This gives instant relief.

It is well to avoid accumulation of used mixed medicines or powders in the medicine chest. When a patient ceases to take them, destroy the remainder, unless the doctor says the mixtures can be kept for later use. A small box kept in the chest or close to it, with safety pins, small bandages, oiled silk, lint and small swabs made of cotton wool can save a lot of time.

The Care of Babies and Children.

[Dr. Crosbie, Brinkworth.]

I have been asked to give you a paper on children. I think perhaps the best way to do so is to start off at the baby stage and then follow their history for a few years.

Most of you have found that the first baby that comes into the house is treated as a curio, and one is a bit diffident about handling it. This applies more especially to the fathers, who are generally frightened to touch them until they are about 6 months old.

In bringing up a baby one of the first essentials is to see that regular habits are set up. By these I mean feeding at regular intervals, at first 3 hourly, then gradually working up to 4-hourly feeds, is possible. It is advisable not to feed babies between 10 p.m. and 6 a.m. After feeding, it is always advisable to put a baby down and let it sleep, only before doing so see that the child is comfortable—that is, that any wind present as a result of the feeding has been brought up, or that there are no pins sticking into the child. The only justification for waking up a child is for feeding, as in the early months of a child's life it requires many hours of sleep.

Feeding.

With regard to food, in the first few months of life, breast feeding is, of course, the best, and a good tip for young mothers is to see that they can always get plenty of rest; lying down for an hour each time a child is due for a feed.

How do you know if a child is getting enough food for its needs? The best way is to weigh it regularly each week and keep a record of its weight. As long as it is gaining, you have not very much to worry about. In the early stages of a child's life, try and get its bowels to act regularly, by holding it out say at bath time, and also see that the child has a daily bath, because the skin of an infant is a very important organ of its body—much more so than in adults, and if we can encourage the skin to act freely, we can often get a great help from it when a child is running a temperature, because sweating will help bring the temperature down.

With regard to artificial feeding, there are broadly speaking, three methods—cows milk, cows milk and some addition to it, and patent foods which consist of dried milk which has been sterilised and converted into a powdered form. For very young babies which have to get on to an artificial food, the best is Lactone Syrup and milk, that is, for children under 3 months. This can be followed up after 6 months with a farinaceous food, and pure cow's milk. Children over three months can generally be safely put on to cow's milk half and half—*i.e.*, half milk and half water, gradually increasing the quantity of milk until about the age of 6 months, when pure milk can be given.

With any form of cow's milk feeding it is advisable to always see that the cows are healthy, and also that the milk is boiled before using, as there are always numbers of germs present in milk which might cause trouble if they enter a child's stomach.

The patent foods such as Lactogen, etc., are more for use in the cities and outback where milk is unprocurable. Often in summer it is advisable to start a baby on it, as there is no risk of germs, for this is a food that is sterilised when it is put up.

Another article of diet for babies is orange juice, which supplies vitamins and also helps against constipation.

Young babies also require plenty of fresh air, so sleeping outside day or night, with precautions to see that they are kept warm, is very good for them.

From the age of 9 to 12 months, a little egg yolk and perhaps a crust can be added, also a little broth occasionally. From 12 months onwards, bread and butter and vegetables may be given, and after about 18 months, meat and fruit can be added to the diet.

DISORDERS.

There are certain upsets that children will get at times; one of these is gastro-entritis, which consists of diarrhoea and vomiting. The best home remedy for this is to withdraw all food and give a dose of castor oil, at the same time letting the child have plenty of boiled water to drink until the condition gradually settles down, when food may be given again, but in small amounts and weaker than normal.

A useful piece of advice here is when a child is sick, keep it quiet in its cot, and preferably bring the cot out when you are working so the child will see someone about. Normally, a child is used to its mother's company—why should it not see her when it is ill.

Another common condition we meet is teething, which text books tell us does not cause trouble, but in practical experience we find it does. With this condition a child will often run a high temperature without showing any other sign, except on looking in the mouth we find that the gums are very inflamed. The child tends to dribble, and is very restless. The best way to treat this condition is by giving the child plenty of fluids and plenty of baths, attending to its bowels and seeing that they are kept well open. Another condition rarely met with these days is convulsions, which are generally due to a poison of some sort in the system, aggravating the brain. It is interesting to note that where an adult would only get a severe headache, a child gets convulsions. The best treatment for this is a hot bath and cold compresses to the head, followed by an enema and a dose of castor oil, because it is surprising how many of these conditions start from stomach trouble, although, of course, there are many other causes, such as pneumonia, colic and earache, to mention only a few of the simple ones. I would advise all mothers to keep in the house an enema and a thermometer, as they are very useful appliances.

Colic is a condition frequently met with in young babies. The baby cries, in fact screams, and draws up its knees on the abdomen, and you can notice the abdomen is fuller looking than usual. This can generally be relieved by hot foments, and an enema of hot water and soap. Of course, the latter should not be hot enough to burn the child—about a temperature of 90°, which you can test with a preserving thermometer.

Earache, another troublesome condition in childhood and babyhood, can generally be diagnosed by the presence of a temperature and the child clutching at its ear. This can be relieved by hot foments to the ear, and for a child over 2 years old, half an aspirin. The conditions outlined above cover most of the common illnesses of babies. I could, however, mention colds. The best way to treat a cold, if severe, is to put the patient to bed and keep her there. Give plenty of warm drinks to encourage skin activity, and do not be afraid to give a baby bath or a sponge, and it is not necessary to withhold food.

The illnesses of older children are very similar, except there is one condition which makes itself very prevalent, namely, appendecitis, for which there is only one safe treatment—removal. The chief symptom is continual pain and abdominal tenderness which may or may not be associated with vomiting, but as a golden rule, you may take it for granted that any abdominal pain that comes on and remains for over an hour requires medical attention.

With regard to first aid in the home, the two most useful medicaments are iodine for deep cuts, and for surface abrasions where all the surface can be washed with a mild antiseptic, treat with peroxide. For burns there is an ointment put up by Burroughs Wellcome called Tannafax.

Resolutions.

Conference carried the following resolutions:—"That the Advisory Board be requested to provide for a lecturer on womens' interests to visit regularly Country Branches: that the Advisory Board be requested to make representation to the Minister of Education to provide for higher education to leaving standard either through the correspondence school or by establishing a high school within easy reach of the following districts:—Yacka, Narridy, Redhill, Brinkworth, Koolunga, Mallee Grove and Beetaloo.

JOURNAL
OF THE
Department of Agriculture
OF
South Australia

VOL. XL. JUNE, 1937. No. 11

Published Monthly by the Department of Agriculture Edited by H. O. PRITCHARD

Page
Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836-1936 829-841
The Importance of Good Pasture Seed 842-843
Wheat Growing in the Mallee 844-853
Shipment of Williams' (Duchess) Pears from South Australia to United Kingdom, 1937 854-860
Tobacco Growing in the Murray Irrigation Areas from the Year 1931 to 1937 861-863
South Australian Committee of Australian Dairy Produce Board 864-866
Papers Read at Conferences 867-868
Stickfast Flea 869
Advisory Board 869-870
Herd Testing Results 871-872
Egg-Laying Competition Review 874
Dairying Districts Field Days 874-875
Rainfall Table 876-877
Bureau Reports 878-891

WOMEN'S BRANCHES.

Bureau Reports 892-894

All communications to be addressed:
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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1937

Eyre's Peninsula (West), at Ceduna, Wednesday, 7th July (Mr. E. Schwarz, Maltee).

Pruning Competitions, River Murray.—Mypolonga (date to be fixed); Cadell, 23rd June; Waikerie, 24th June; Moorook, 25th June; Berri, 29th June; Barmera, 30th June; championship at Waikerie, 1st July.

Upper North, at Booleroo Centre, Wednesday, 21st July (Mr. C. J. Carey and Miss V. Keller).

Pinnaroo Line, at Lameroo, Tuesday, 3rd August (Mr. J. L. Byrne).

Murray Lands West, at Karoonda, Thursday, 5th August (Mr. W. R. Trestrail, Coomandook).

Southern, at Milang, Thursday, 19th August (Mr. L. E. Yelland and Miss Ruth Whitfield).

Murray Lands East, at Taplan, Tuesday, 28th September (Mr. G. R. Hodge and Mrs. Hodge).

Eyre's Peninsula (East), at Cowell, Monday, 18th October (Mr. S. D. Ramsey, Cowell), Miltalie Branch.

Eyre's Peninsula (Lower), at Ungarra, Wednesday, 20th October (Mr. W. G. Gordon).

Eyre's Peninsula (Central), at Poochera, Friday, 22nd October (Mr. F. R. Joy).

Fruit Districts, at McLaren Flat, Tuesday, 2nd November (Mr. W. H. Kyloh).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.							
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	
	June.	June.	May.	May-June.	June-July.			
1937.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	
May 20..	5 10⅞	5 10½	6 0⅜	6 2¼	5 9⅜	—	—	**New South Wales—Parcel of 200 tons (afloat), at 5s. 10½d.**
			June.			July-Aug.	Sept.	
May 27..	5 9¾	5 9	5 10⅜	5 11½	5 7½	5 9	5 6¾	**New South Wales—7,500 and 5,777 tons sold to Italy; 400 tons (afloat), at 5s. 9¾d. New South Wales or Victoria—8,500 tons (May), at 5s. 10d. South Australia—5,000 tons (August), at 5s. 9d.; 3,600 tons (afloat), at 5s. 10⅛d.; 3,000 tons (afloat), at 5s. 10⅛d. South Australia or Victoria—8,500 tons (afloat), at 5s. 10⅛d.; 8,500 tons (May), at 5s. 10d.**
June 3..	5 8¼	5 7½	5 6⅜	—	5 5½	5 4¾	5 4½	—

THE JOURNAL

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Department of Agriculture

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South Australia

Vol. XL. JUNE, 1937. No. 11

Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By ARTHUR J. PERKINS, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 775.)

THE FIRST DECADE, 1836-1846.

CHAPTER V.

Recall of Governor Hindmarsh—His abrupt return to England to vindicate his actions—Instructions from Colonisation Commissioners for a "Running Survey"—Peculiar correspondence between Colonisation Commissioners and Kingston—Kingston prepared to carry out Running Survey should Light decline to do so, even if the whole staff were to resign—Light declines to conduct Running Survey—Return of Kingston from England—Refuses to state that present progress of surveys sufficient to justify Fisher in setting aside Running Survey—Light declines to accept any further employment under the insulting conditions—Kingston instructed to proceed with Running Survey—Resignation of the staff—Meeting of holders of Land Orders—Kingston compelled to recognise Progress of Surveys sufficient to warrant suspension of Running Survey.

It was stated in an earlier chapter that towards the end of June, 1838, the brig *Rapid*, Lieutenant Field, R.N. in command, had brought with it, on its return journey from the United Kingdom, a letter of recall (1) for Captain

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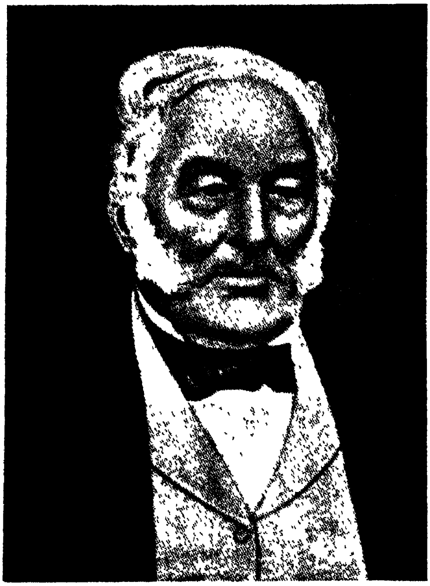
(1) Lord Glenelg to Governor Hindmarsh, 21st February, 1838, and James Stephen Colonisation Commissioners of same date.

Hindmarsh from the Secretary of State for the Colonies (Lord Glenelg). By the same vessel a despatch ([2]) ordering a revolutionary reversal of policy in the matter of country surveys was received by the Resident Commissioner (J. H. Fisher) from Rowland Hill, Secretary to the Board of Colonisation Commissioners. The former communication had been courteously, sympathetically, not to say apologetically worded: it recognised that Captain Hindmarsh "had been placed in a situation of great difficulty and embarrassment, and that he had not met with that degree of support and assistance from some of the local officers . . . which he had a right to expect." On the other hand, a deputation "composed of the representatives of all the leading interests attached to the Colony and the South Australian Land Company" had recently urged upon Lord Glenelg "the removal of Captain Hindmarsh from the Government, as the unanimous desire of themselves and of those whom they represented." This request was subsequently supported by a written statement from the Colonisation Commissioners "who were charged with the chief responsibility of executing this new experiment in colonisation," and from whom Lord Glenelg "was unwilling to withhold . . . the means which they had deliberately pronounced indispensable to the due discharge of the trust committed to them." Nevertheless "since his assumption of the Government of South Australia, nothing had occurred in the proceedings of Captain Hindmarsh to detract from the opinion which Lord Glenelg had originally been led to entertain in favour of his character as an officer and a gentleman"; and "nothing less than a sense of public duty, which he had discharged with a most unaffected reluctance" could have induced Lord Glenelg to sanction Captain Hindmarsh's recall.



Robert Thomas, one of the original printers and publishers of the *South Australian Gazette & Colonial Register*.
[*Plate* 84.] [*Reference page* 840.]

When it became bruited abroad that Captain Hindmarsh had been recalled, and would shortly be leaving the Colony, hurried steps were taken to prepare a farewell address, couched in the most flattering terms, and said to have been signed by several hundred of South Australia's most "respectable" citizens. This was the address to which David McLaren (Manager of the South Australian Company) had declined to affix his signature, "because although it took low ground as to his (Hindmarsh's) public character and acts, yet gave him credit for qualities which *he* (McLaren) had not *seen.*" ([3]) This probably unexpected evidence of a proper appreciation of his merits, coupled with the eulogistic letter of recall, seemed to have heartened Captain Hindmarsh, and confirmed him in the view that could he but show his face in the metropolis of the British Empire, he would have little difficulty in refuting the calumnies that had shaken his authority and brought about his apparent downfall—to which Kingston and

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([2]) Rowland Hill to J. H. Fisher, 31st January, 1838. See *Southern Australian* 7th July, 1838, page 3, col. 4.

([3]) David McLaren to E. J. Wheeler, 28th June, 1838.

Gouger (4) had no doubt given the apt finishing touches—and securing a reversal of the mistaken decision of an obviously admiring Secretary of State. And accordingly, on the 14th July, 1838 (5)—after an uneasy rule of almost exactly 18½ months—Captain Hindmarsh boarded H.M.S. *Alligator* for England, *via* Sydney: his family he left behind him in Adelaide, in the confident belief that he would shortly return triumphantly to it for an extended period of office. But the utmost the British Government was able to do for him in the matter was to make him Governor of Heligoland in 1840, in which office it is probable that his naval upbringing and talents stood him in better stead than they did in South Australia. (6)

Charles Mann, first Advocate-General in the Colony and reputed first Editor of the *Southern Australian*.
[*Plate* 35.] [*Reference page* 840.]

We have been told (7) that Captain Hindmarsh's abrupt departure from South Australia was in direct contravention of official instructions to the effect that he should await the arrival of his successor. Such an offence, had it indeed been committed, would have been surprising in a man of Hindmarsh's training and professional instincts: nor could it well have been condoned by the authorities at Home. The official letter of recall from the Secretary of State did no more than state that "he must consider himself as holding office until the arrival of his successor": and this sentence seemed to have been misconstrued into an order not to quit the Colony until the arrival of his successor, which after all was quite another matter. As a matter of fact, on the eve of his departure Hindmarsh wrote to the Secretary of State (8) that he was leaving for England in order to vindicate his character and administration of government: and that during his absence the Advocate-General—George Milner Stephen (9)—who was at the time senior member of the Council, would be Acting-Governor. It does not seem probable that Hindmarsh would have written in such terms had he received definite instructions from the Secretary of State for the Colonies—his immediately superior officer—not to leave the Colony until the arrival of his successor.

The despatch received by the Resident Commissioner (10) by the same vessel as Hindmarsh's letter of recall was the anxiously awaited reply of the Colonial

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(4) Robert Gouger, Colonial Secretary, had been suspended from office by Hindmarsh for taking part in a street brawl in which he had hit the Colonial Treasurer (Osmond Gilles). Gouger left the Colony for England with the avowed object of securing the dismissal of Governor Hindmarsh, of his Private Secretary, George Stevenson, Osmond Gilles, and T. B. Strangways, his successor in office. (*Vide* David McLaren to E. J. Wheeler, 22nd and 23rd August, 1837.)

(5) *Southern Australian*, 14th July, 1838, page 3, col. 1.

(6) *History of South Australia* by Edwin Hodder, page 104.

(7) *Foundation and Settlement of South Australia* by A. G. Price, page 130.

(8) Governor Hindmarsh to Lord Glenelg, 14th July, 1838.

(9) G. M. Stephen had been called by Hindmarsh from Van Diemen's Land, where he held the position of a clerk in the Supreme Court, to take up the position of Advocate-General vacated by Charles Mann on 9th February, 1838. He subsequently married one of Hindmarsh's daughters.

(10) *The Southern Australian*, 7th July, 1838, page 3, col. 4.

Commissioners to the urgent plea of Fisher and Light for more men and material for the rapid prosecution of the country surveys: and the plea, it will be recalled, was to have been supported verbally by the Deputy-Surveyor—G. S. Kingston who had been specially sent to England for that purpose. This sinister document was unquestionably the product of the brain and hand of Rowland Hill, Secretary to the Board of Colonisation Commissioners, although probably with Kingston at his elbow; indeed it was conceived and executed so much to the advantage of the latter, that it was almost impossible to imagine him in any other position at the time. Nevertheless neither the Board, nor individual members thereof could in honour deny responsibility for the consequences that followed, on the excuse that their accredited mouthpiece had failed to convey their exact meaning, or at all events had clothed it in language of which they could not approve.

"In order to secure the early completion of the Preliminary Surveys," said the despatch, "the Commissioners considered it necessary to make arrangements for the vigorous prosecution of such surveys on the plan laid down" in an earlier despatch. This decision implied the abandonment of the accurate trigonometrical survey inaugurated by Colonel Light, and the adoption of a "running survey" recommended by Lieutenant Dawson, an English Surveyor without any Colonial experience, whom the Commissioners had consulted. The Commissioners believed that Light *might* refuse to have anything to do with the proposed change—had he felt so inclined Kingston could have assured them that Light would most certainly have refused—accordingly they secured Kingston's signature to an engagement to carry out a running survey of 150 square miles of land in a specified time "if on his arrival in the Colony the management of the survey should devolve upon him."

The Resident Commissioner was therefore instructed "immediately on receipt of the despatch—unless the Preliminary Surveys were actually completed—"to ascertain from Colonel Light whether he would be prepared to give a written pledge, to the effect that he would undertake a running survey of 150 square miles, on terms and conditions indicated in correspondence with Kingston, whilst the latter was in England. Light was to be allowed *one week* to come to a decision on the subject; but should he decline to act as desired, or fail to reply within a week's time, Fisher was to inform him "that his authority as Surveyor-General would be suspended until the task to be assigned Kingston had been completed."

In the meantime the Commissioners desired that Colonel Light should employ his enforced leisure "*with such necessary assistance as Kingston might be able to spare*" in surveying land in Nepean Bay and other secondary sites, and completing the examination of the coast and of Lake Alexandrina. "If this arrangement were adopted the Commissioners would be happy to continue to Colonel Light his full salary."

Finally, the Commissioners declined to increase the number of surveyors as urged by Fisher and Light—on the grounds that such a measure was unnecessary—except for the appointment as Assistant-Surveyor of Corporal McLaren, who had been strongly recommended to them by the officers of the Ordnance Survey. Additional tools, instruments, tents and rations were however forwarded by the *Rapid* and the *Eden* respectively.

There was a postscript to the despatch exonerating Kingston of any self-seeking in the matter of his engagement to undertake a running survey, should Light decline to do so: the engagement had been entered into "at the express desire of the Commissioners, and not until they had decided as an alternative to send out *another gentleman* who had offered to contract for a certain sum to effect the surveys in question." But this *apologia* was far too transparent to be effective, even when repeated in a Report of the Colonisation Commissioners (11): and when given publicity in the Colony deceived nobody, not even Kingston himself.

In the latter connection the correspondence between Kingston and the Commissioners, to which reference was made in Rowland Hill's despatch, was illuminating beyond the writer's intent. The *Rapid* reached England on 5th November, 1837, and by 13th December we know that Kingston had crossed the Rubicon, and entered into a binding engagement to undertake a running survey of 150 square miles in South Australia. On the following day he wrote a letter (12) in an endeavour to consolidate his position with the Commissioners, and at the same time to forestall probable colonial criticism on his return home. He began by calling attention to "the delicate situation in which he found himself *thus unexpectedly* placed by being called upon to express his willingness to undertake a work on the supposition that his superior officer might decline it *as out of his power to effect.*" It suited Kingston's obliquity to suggest an inadequate motive for Colonel Light's almost certain refusal to discard an accurate trigonometrical survey for an inaccurate running survey. Kingston then proceeded to point out how in his opinion Light's assumed scruples might be overcome. "As the completion of the Preliminary Surveys is of such great importance," said Kingston, "and as Colonel Light's *declining to undertake them in a limited time* might much impede their completion, and as this is only likely to take place from his opinion of the *strength of the corps not being sufficiently great,* allow me respectfully to suggest to you a measure which by enabling him to offer a reward to extraordinary exertion on the part of his officers, may not only give him the means of completing the surveys within a given time, but also *secure to the Colony the continuation of his valuable services as Surveyor-General.* I would, with permission, propose that you name a sum of money (13) to be divided amongst the Assistant-Surveyors, provided the work is finished within the time specified by you." This, as was pointed out in the press (14), was tantamount to an attempt to bribe the surveyors to do their duty: but to a man of Kingston's tortuous mentality such a proposal classed him definitely as a loyal supporter of Light's tottering authority and a special friend to the latter's junior officers.

Kingston's next proposal seemed to suggest that his march towards the Rubicon had started not later than a fortnight after his landing in England. "By reference to my letter of the 20th November," said he, "you will note that I have stated it was my opinion that 'four active and efficient surveyors ought to effect the survey of 150 square miles in the manner therein specified in two months'." In other words, not later than a fortnight after reaching England, not only had Kingston given up all attempt to combat the running survey, dear to the hearts of the Commissioners, but obnoxious to Light, but he had actually undertaken to improve upon Dawson's original plan by showing that in his (Kingston's) hands, work for which Dawson had allowed four to six months to complete, would be completed in two.

And lastly when asked by the Commissioners "in what time he would undertake to finish the survey" in the event "of a part, or even the whole corps of the surveyors resigning their situations at the same time as Colonel Light," Kingston replied, that even in the extreme case of having to train fresh officers, he would undertake to complete the survey in five months. And this, be it understood, was the man who had been sent out as Light's confidential envoy on a lengthy journey, involving 12 months' absence from urgent duties, in order among other things, that he might bring back with him 12 competent surveyors; but who, when in England, not only undertook to complete the survey of 150 square miles, but to do it with the assistance of five untrained men whom he would train within the same time. Such actions however feasible could hardly be represented as loyal support of his superior officer.

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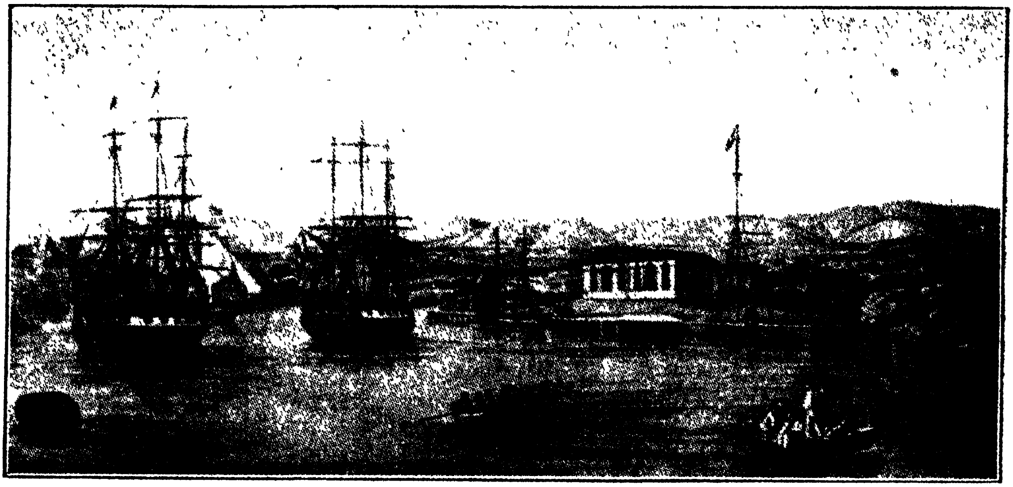
(11) Third Report of South Australian Commissioners, page 37.
(12) *Southern Australian,* 14th July, 1838, page 3, col. 4.
(13) The Commissioners set aside £300 for the purpose.
(14) *The Southern Australian,* 14th July, 1838, page 3, col. 1.

In the meanwhile a careful study of the famous despatch had placed Fisher on the horns of a dilemma: the instructions which it conveyed alike humiliating to himself, as a leading officer in the Colony, as they were insulting to Colonel Light, were nevertheless peremptory: they imposed upon him a line of action, which if followed could but be extremely unpopular in the Colony; and would almost certainly lead to the resignation of a man whose ability he recognised and respected; and who had gained and retained the confidence of the great majority of the colonists. On the other hand, should he fail to carry out his instructions to their ultimate intent, his own position as Resident Commissioner, already precariously balanced, would become untenable. It seemed however that Rowland Hill had somehow left him one doubtful loophole of escape, did he but know how effectively to take advantage of it: the drastic enforcement of the steps prescribed by the Commissioners was subject to the proviso *that the Preliminary Surveys had not been actually completed at the time.* It had already been pointed out in an earlier chapter (15) that the 437 Preliminary Land Orders corresponded to an area that did not exceed 59,000 acres, of which 40,000 acres had already been selected since May, 1838; and that an additional 100,000 acres would be available for immediate settlement, as soon as the surveyors had completed the task of staking out the surveyed sections. In the circumstances, could it be honestly said that the "Preliminary Surveys had been actually completed"? Strictly speaking, "No," because the unsatisfied holders of Preliminary Land Orders, corresponding to about 19,000 acres, insisted upon a right of choice throughout the Colony, which in extreme cases might be interpreted as "not until the length and breadth of the province had been explored and surveyed." But, as we have already seen in the same chapter (16) Fisher had come to a compromise with the latter, by which whilst on the one hand the colonists agreed to reserve their future land selections for



[*Plate* 36.] **Port Adelaide in 1842.**

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(15) Chapter 2, page 553.
(16) Chapter 2, page 552.

certain specified districts, Fisher on the other had agreed to get these specified districts surveyed at the first opportunity. In such circumstances there could be little doubt that a soul constitutionally less timorous, less bound to precedent and the letter of the law than Fisher, would have seized upon this loophole, and left Light and his surveyors in peace to continue the good work.

But such was not the course Fisher chose to pursue, in the main perhaps because oppressed by the dangers suggested by the immediate present, he was blind to the fury of the local storm his actions were about to evoke. Accordingly he fell back upon his usual Fabian tactics and decided to temporise, trusting that the early return of Kingston to the Colony might open up some new avenue of escape from a dangerous position. Hence he complied with his instructions to the extent of writing to Light on the 21st June 1838 ([17]) and enclosing extracts from Rowland Hill's despatch: but in conclusion he expressed the hope "that Mr. Kingston"—the subordinate officer, or should we say "*insubordinate*"—"may arrive before the expiration of that time"—*i.e.*, one week from the date of Fisher's letter—"as immediately upon his arrival I shall communicate to him the present state of the survey, and request him to inform me whether from any knowledge he may possess of the views and notions of the Commissioners, it has or not already proceeded to an extent, which they would consider so sufficient and satisfactory as to dispense with the necessity of the contemplated running survey, and your replying to the requisition which by their desire I have herein conveyed to you." But Light was a man of other mettle, who in such circumstances refused to temporise: his reply was immediate, brief, and to the point: "In reply to your letter" said he on the 22nd June, "I beg to state that I do not require one week to consider this matter, but say at once that *I will not do it;* and that I despise and contemn the language used by Mr. R. Hill. The subject of the correspondence, &c., &c., between him and Mr. Kingston, I shall notice at leisure. In the meantime I must add that Mr. Hill's motive is too apparent to be misunderstood." ([18])

At this stage the barque *Eden,* 523 tons, Captain Cook, which sailed from London on 26th February, 1838, reached South Australia on 24th June, with 228 passengers, among whom were Mr. and Mrs. G. S. Kingston. ([19])

On the 26th June, with commendable promptness, Fisher wrote at great length to Kingston outlining the Commissioners' instructions—with which of course Kingston was already familiar—and indicating the action which he had already taken in connection with them; which had led to Light's uncompromising refusal to have anything to do with the running survey. He then proceeded to supply Kingston with full details as to the progress made in the survey during the latter's absence from the Colony; and explained to him his (Fisher's) dilemma, as to whether or not the Preliminary Surveys were sufficiently advanced to meet the wishes of the Commissioners in the matter and render unnecessary a running survey of 150 square miles of new land. Mr. Kingston, Fisher suggested, had been in recent contact with the Commissioners, and should therefore be in a position to give an authoritative opinion as to "their ideas and wishes" and he was accordingly requested to do so.

Kingston's reply of the 30th June was a literary curiosity and typical of the man. It consisted of 151 lines, ([20]) 123 of which were given to a clever recapitulation of Fisher's statements and difficulties, and 28 to Kingston's reply to the latter, or rather evasion of the latter. "In reference to the questions which you have thus submitted to me," said Kingston in conclusion, "I

([17]) *Southern Australian,* 7th July, 1838, page 3, col. 3.

([18]) *Southern Australian,* 7th July, 1838, page 3, col. 4.

([19]) In chapter 2, page 553, it was stated in error that Kingston had returned by the *Rapid.*

([20]) The lines referred to were lines in a column of the *Southern Australian.*

beg to assure you that I have weighed them with the most anxious attention, but after mature deliberation I submit to you, that the despatches of the Commissioners contain such an expression of their sentiments on the subject alluded to, as would render it presumptuous in me to add anything to the written instructions which you have received. I beg respectfully to submit that the information furnished in your letter, is such as to enable you as Colonial Commissioner on referring to your despatches, to judge whether or not the surveys have or not already been proceeded to an extent such as would be sufficient to give effect to the wishes of the Commissioners in directing the running survey. Should you, on reflection, see fit to take the steps which are indicated to you in despatch No. 2 of the date 31st January, 1838—with a copy of which the Commissioners have furnished me—I shall feel honoured by your command and will immediately proceed to carry into effect the duties which will then devolve on me.

"Allow me also to say that it is with the *deepest regret* that I should assume the position which such duties imply, and that none in the province more appreciates the unquestionable ability of the Surveyor-General, or would more cheerfully act under his command."

Kingston, whose natural cleverness had no doubt already sensed the local feeling in the matter, seemed to have insolently brushed aside the fact that to all intents and purposes he had become Fisher's technical adviser, and with oriental unction declined to be made the scapegoat of the drama. Attention need scarcely be drawn to the obvious insincerity of the concluding paragraph of Kingston's letter.

Fisher, not unnaturally, was dissatisfied with so evasive a reply, which did no more than refer him back to his original instructions, with the contents of which, he pointed out, he was of course familiar before writing to Kingston; and upon which he had built the questions which Kingston had evaded. "After the full explanation I have given to you of the present state of the surveys," added Fisher in reply, "I cannot at any rate but conclude that you do not consider those surveys, coupled even with the arrangements made with reference to the various other districts, to which it has been agreed the Preliminary Surveys shall extend, sufficient to satisfy the wishes of the Commissioners and to justify you in expressing an opinion that no necessity exists for the running survey." And such being the circumstances, Fisher informed Kingston that the superintendence of the survey had developed upon him and that he must take immediate steps to give effect to the running survey.

On the same day—2nd July, 1838—Fisher wrote to Light that as he had been unable to obtain from Kingston "information which might have rendered the running survey unnecessary" and as Light had declined to give the "required pledge" to effect such a survey, it had become Fisher's "painful duty" to inform Light that the superintendence of the surveys had in accordance with the Commissioners' instructions devolved upon Kingston, and that in consequence Light's authority as Surveyor-General was suspended until the task assigned to Kingston had been completed. Fisher then went on to remind Light that "during the temporary suspension of his authority it was the wish of the Commissioners that he should be employed—*with such necessary assistance as Kingston would be able to spare*—"in special work at his full salary."(21) To this communication Light's reply was prompt and characteristic: he was ready at any time to give over the office with maps and instruments, &c., to Kingston, as he (Light) "had ceased to act in the survey." And in reply to the concluding portion of Fisher's letter he stated that Rowland Hill might save the Commissioners the expense of his (Light's) salary (£400 per annum) "for he would never take office under such insulting conditions." (22)

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(21) *Southern Australian*. 14th July, 1838, page 4, col. 4.

The goal of Kingston's ambitions—the Surveyor-Generalship, coveted by him as far back as 1836 before Light's appointment to that post—was now in full sight. Nevertheless, there were still difficulties ahead: there was the colonists' attachment to Light, and their confidence in his ability, which he (Kingston) must continue to make some show of sharing; their rising hostility to himself which he must placate or circumvent; and finally there were shifting authorities to be courted and supplied with proper viewpoints. Above all, in the dissensions which he sensed in the offing, it was essential that he should remain neutral, or at all events be decked with neutral insignia. Accordingly, he began by taking Fisher to task for ascribing to him (Kingston) the view that "the progress of the surveys, coupled with the arrangements entered into with the holders of Preliminary Land Orders" had been insufficient to meet the wishes of the Commissioners, and to justify Fisher in concluding that there was in consequence no necessity for a running survey. "I must distinctly disclaim" said Kingston with perfect truth, "that I have expressed any such opinion." (23) Nevertheless, Fisher was amply justified in assuming that such indeed was the viewpoint that Kingston wished him to adopt.

He then announced to Fisher that he proposed taking immediate steps towards effecting the running survey to the north of the land already surveyed by Colonel Light. But should Fisher "be of the opinion that the rights of the Preliminary purchasers will be affected by the delay which must necessarily occur, before the sections were marked off in the reserved districts, he would, on receiving Fisher's order to that effect, proceed to any district the latter might name." In other words, Light once safely out of the way, Kingston began to veer to the popular opinion that after all the "running survey" when viewed in South Australia did not appear to be quite as necessary as it had appeared to be in England: and he attempted to trim his sails accordingly. But by this time, Fisher had had ample experience of Kingston's nimble craftiness, and on the present occasion firmly declined to allow "any deviation from the terms of Kingston's engagement with the Colonisation Commissioners to survey 150 square miles within the period prescribed." He himself was quite well aware of the importance of marking out the selected sections, and handing them over to their owners as soon as possible: and so soon as Kingston was ready to proceed with the running survey, he (Fisher) would consider what steps could best be taken to that end. (24) Nevertheless Fisher did adopt Kingston's suggestion to call together a meeting of Preliminary purchasers, for the purpose of explaining to them the difficult position in which the officials had been placed by the recent decision of the Commissioners; and of ascertaining the opinions of the colonists generally as to what would in the circumstances be the best course to adopt. Fisher no doubt, after due consideration, had come to the conclusion that the deliberations of the colonists in the matter would in all probability prove more favourable to his interests than to those of the wily Deputy-Surveyor: accordingly, by advertisement in the press he convened a meeting of Holders and Representatives of Holders of Land Orders, to be held at his office on Monday, 9th July, at noon precisely, for the purpose of taking into consideration the recent change in the Survey Department; and recommending to him the adoption of such a course as to them might seem best for the protection of their interests in the existing peculiar state of that important department. (25) Moreover, Fisher must have been aware that the majority of colonists was most anxious to learn from Kingston's own lips how it had come about that his mysterious mission to England had eventuated in measures that could benefit nobody but himself: and accordingly Fisher instructed the latter to hold himself in readiness to attend the meeting. (26)

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(22) *Southern Australian,* 14th July, 1838, page 4, col. 4.
(23) *Southern Australian,* 14th July, 1838, page 4, col. 3.
(24) *Southern Australian,* 14th July, 1838, page 4, col. 4.

In the interim, Kingston took steps to ascertain whom of the Assistant-Surveyors he could depend upon to assist him with the running survey. To this end, he addressed to all of them a circular letter in which he informed them of his assumption of office for the purpose of completing a running survey of 100,000 acres in two months with the assistance of "four efficient and active officers," and in proportionately more or less time according to the number of surveyors employed for the purpose. They were also advised of the generosity of the Commissioners, who had agreed to award a bonus of £300, which would be divided amongst the officers employed, in proportion to the individual exertions of each one, provided however that such survey were completed within the specified time. A definite reply was requested by the day following.

"Klemsic, a Village of German Settlers, near Adelaide."

[*Plate* 37] [From C. F. Angas, *South Australia Illustrated*, 1846.]

This circular missive had been dated "3rd July, 1838": but unfortunately for Kingston—or had he perhaps anticipated it—10 of the Assistant-Surveyors and the Surgeon for the Survey had on the preceding day addressed a letter to Fisher, to the effect that information had reached them that Kingston "was to superintend the surveys of public lands in the colony" and that if such information were confirmed they would collectively resign their positions in the Survey Department. Such action, however, would not be taken with a view to embarrassing the Resident Commissioner or the Colonisation Commissioners; but because Kingston was "a man whose scientific fitness, either to report upon their qualifications, or to direct their work, they were not disposed to admit, from the experience they had already had of his abilities. . . . Kingston's unbecoming and ungentlemanly behaviour to those who had to co-operate with him during the short time he was supposed to be assisting Colonel Light in the survey, was probably the cause of that discord which he reported he perceived in the Surveying body, and which he appeared to have maliciously attributed to party feeling. This view of the case is confirmed by the unanimity which was apparent from the moment of his departure for England." (27) This defection of the surveyors left Kingston with a staff consisting of Corporal McLaren, who had accompanied him on his return from England, and two junior officers of doubtful competency: and as very shortly afterwards Kingston was to quarrel with the latter two, who accordingly left so uncongenial a service, his staff was finally reduced to one.

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(25) *Southern Australian*, 7th July, 1838, page 3, col. 1.

(26) Resident Commissioner's Letter Book: Kingston to Fisher, 16th July, 1838.

In due course the meeting convened by the Resident Commissioner took place at his office at noon, 9th July, 1838. "The number present was indicative of the intense interest the subject had excited: the room was crowded to overflowing and nearly every section of land was represented." (28)

The first resolution placed before the meeting—probably by prior arrangement with Fisher—was to the effect that the Resident Commissioner be requested to communicate to the meeting the whole of the correspondence which had led to the late changes in the Survey Department. This resolution was said to have been carried unanimously: and accordingly Fisher vacated the chair in favour of David McLaren, Manager of the South Australian Company, who continued to occupy it throughout the course of this series of meetings.

Fisher's next step cannot be described otherwise than a deliberate breach of a time-honoured official custom, namely, the confidential nature of official communications; and excusable if at all, on the major ground of self-preservation, to which end he perhaps risked "blazing indiscretions" like a famous British Foreign Secretary in succeeding decades; but whatever the motive, Fisher proceeded to submit strictly confidential official communications for the judgment of a public meeting, and subsequently for publication in the press of the day. Extracts from some of these documents have already been given in the course of this narrative, and how embarrassing to those chiefly concerned, but in particular to the Colonisation Commissioners and G. S. Kingston, must have been this deliberate broadcasting of confidential material will be readily understood. Nevertheless, some consideration must be given to the difficult position in which Fisher found himself: with his back to the wall, he had no whither to turn for advice and guidance: he had reason to suspect, if he did not actually know, that for him the Commissioners were preparing that fate, in which he himself had helped to involve the unfortunate Hindmarsh: call it dismissal, or recall, or any other palliating term. He knew that his most recent chief technical adviser—the wily Kingston—was determined, if possible, to stand clear of all entangling responsibilities, to the extent even of evading the advice and assistance which Fisher had a right to expect from him. He knew, too, that the colonists resented very strongly Light's enforced resignation, and were resolved to withstand any attempt to impose a running survey upon them: and moreover, unofficially, he was in sympathy with the viewpoints of his fellow colonists: and in his dire extremity he preferred to bid for their goodwill and backing, rather than trust himself to the tender mercies of the Colonisation Commissioners. Nor, on the whole can we altogether blame him for his actions in the matter.

When the reading of the letters and despatches had been completed, a desultory discussion took place, during the course of which Kingston's conduct in England was challenged: (29) and although he violently repelled any accusation of disloyalty to his chief he admitted that he knew that his conduct would probably be criticised on his return to the colony. Eventually, the meeting unanimously adopted a resolution expressing "the utmost reliance on the perfect competency of Colonel Light, and being fully satisfied with the able manner in which he had conducted the duties of his office, and requesting the Resident Commissioner to restore him to office, in order that he might carry on and complete such surveys without further delay." (30) To this Fisher eventually replied that "after the most painful as well as the most mature deliberation" he had come to the conclusion that his instructions did not admit of his complying with their request.

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(27) *Southern Australia*, 7th July, 1838, page 4, col. 1.
(28) *Southern Australian*, 14th July, 1838, page 3, col. 3.
(29) *South Australian Gazette and Colonial Register*, 21st July, 1838, page 4, cols. 1 to 4.

Two additional resolutions were subsequently submitted and unanimously carried. The first resolution requested the Resident Commissioner to instruct Kingston not to proceed with the running survey, but to complete without further delay the trigonometrical survey already begun: and the second, requested that the colonists who had already selected their selections should be put in possession of them at the earliest possible moment, and that early facilities should be provided for the selection of land in districts not yet mapped out. To the first resolution, Fisher replied that just as in such a matter he would have been guided by the advice of Colonel Light had the latter continued in office, so in the present instance, although personally he would willingly comply with their wishes he felt convinced that he could not do so with propriety, until Kingston, upon whom the direction of the survey had now devolved, had definitely and unequivocally expressed the opinion that the course proposed by the meeting was better calculated to give effect to the wishes of the Commissioners than the running survey. As to the second resolution, he would do his best to give effect to it.

And thus skilfully had Fisher driven Kingston into the open, and forced him to declare himself definitely on the side of the colonists or on that of the Commissioners: and whatever his decision in the matter to assume full responsibility for whatever course might ultimately be adopted. Kingston made one last effort to cloud the issue in a long and rambling statement, which he submitted to an adjourned meeting. He was however given very plainly to understand that his reply was in fact no reply at all to the simple question that had been put to him: and ultimately he agreed "that he thought under existing circumstances it would be more consonant with the wishes of the Colonisation Commissioners that the trigonometrical survey should be carried on and completed rather than that the running survey should be commenced."

And thus was the triumph of Fisher complete, except for whatever regret he might have felt for the loss of Light's efficient services. "I shall adopt the wishes of the meeting" said he "provided that that adoption meets with the unanimous coucurrence of the meeting by a resolution in which should be contained the opinions of Mr. Kingston. I shall then order Mr. Kingston to carry on and complete the trigonometrical survey." A resolution was then unanimously adopted embodying the wishes of the Resident Commissioner: who himself then instructed Kingston to take all steps to meet the wishes of the meeting of holders of Land Orders. (31)

South Australia had at the time the doubtful advantage of the partisan guidance of two weekly news sheets, namely, *The South Australian Gazette and Colonial Register,* Robert Thomas & Co., Printers and Publishers, and George Stevenson, Editor, the first sheet of which was printed and issued in England on 18th June, 1836, on the one hand: and on the other, *The Southern Australian,* Archibald MacDougall, Printer and Publisher, and Charles Mann, first Advocate-General of the Colony, and one of the chief opponents of Governor Hindmarsh, Editor. The former of the two—the *Gazette and Register*

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(30) *Southern Australian,* 14th July, 1838, page 3, col. 3.

(31) *South Australian Gazette and Colonial Register,* 21st July, 1838, page 4, cols. 1 to 4.

—was from the strictly moral standpoint in a somewhat anomalous position: as "*Gazette*" it was the recognised mouthpiece of government; and as "*Register*" a free and independent sheet, or what passed for such. But to add to the complications, its first Editor was also in its opening years Private Secretary to Governor Hindmarsh and Clerk of the Council; and held besides quite a number of other minor official posts: hence, what with the natural claims of a Government subsidy for printing the *Gazette* and other Government printing requirements, the inside knowledge that came from close association with Government affairs and deliberations, and the veiled privilege of shaping Government policy from behind the throne, coupled with an overbearing, domineering temperament caused George Stevenson to direct tho *Register* along what he considered to be sound lines of Government policy, and to trounce therein all who dared to oppose it. Unfortunately, at the time, the opponents of Government far exceeded in numbers and ability the supporters; and the former naturally felt aggrieved that the only news sheet in the colony had strayed away from an impartial outlook in matters colonial—but was there ever a newspaper that had an impartial outlook or that ever will—and in due course proceeded to found a news sheet of their own *The Southern Australian*—which set about broadcasting their own brand of "impartiality" on the 2nd June, 1838. From that time onwards the columns of these two papers were almost entirely confined to local polemics not altogether unworthy of the *Eatanswill Gazette* and the *Eatanswill Independent,* the exploits of which, by the way, were being first published at the time of the foundation of South Australia.

Whilst preparing the paragraph above I fully realised that to tack it to the tail end of a chapter purporting in the main to describe dramatic episodes in the history of the surveys of the colony, had laid me open to the accusation of lack of artistry in closing a chapter on an anticlimax. So be it: I wished however to make abundantly clear how great must have been the popular feeling at the time as to force these two inveterate enemies—*The Gazette and Register* and *The Southern Australian*—to speak for the first time with one and the same voice: neither of them would have anything to do with the running survey of the Colonisation Commissioners nor vary in their opinion of Kingston as a director of the Colonial survey.

(*To be continued.*)

Delegates at a Dairymen's Field Day which was held at Charleston on 13th May on the property of Mr. T. M. Smee.

The Importance of Good Pasture Seed

[By R. C. Scott, Chief Agricultural Adviser.]

The importance of sowing only good pasture seed cannot be overstressed.

A plant yielding an abundance of leafy material that is relished by livestock occupies very little additional land to one possessing spreading habits and producing coarse stemmy growth of low feeding value. On the other hand the former obviously yields a greater amount of fodder per unit of area and is therefore of more value to the livestock owner.

Applying the above principle to animals, the sheep, for example, that carries a heavier and better quality fleece, or the cow that produces a greater amount of butterfat per annum costs little more to keep than the beast that is inferior in these respects, but on the other hand is much more profitable to the owner.

As soon as a stockman ascertained these facts he would cull out the poorer class animals and build up his flock or herd from the superior stock. The average pasture grower cannot do this as he does not harvest his own seed, but purchases his requirements from outside sources. As a result he must be particularly careful to see that these inferior types are not included in the parcel of seed he obtains.

The Agrostologist working with plants instead of animals adopts the same lines as the livestock breeder. He notes the growth habits of individual plants, isolates the best pasture types and uses these for building up seed supplies for distribution. Much of this work is in progress throughout the world by which there is not only an improvement in the standard of a particular variety, but also the development of special strains within the variety possessing superior qualities of one form or another. Nature also assists in the selection of pasture strains, particularly with regard to the development of plants best suited to the soil and climatic conditions of the district.

It is a case of the "survival of the fittest," and plants that are unable to survive the dry weather of summer, or the grazing of animals, or carry on because of free seeding habits, &c., simply die out whilst the more suitable types persist. This has happened with much of the perennial rye-grass planted by early settlers, and that which in many districts is described as native rye-grass is simply the strain that has persisted from the imported seed sown by colonists many years previously.

Within these local strains of perennial rye-grass, however, differences occur which affect their grazing value, and in this connection the desirable characteristics looked for by livestock owners are semi-erect growing, dense leafy plants, ability to recover rapidly after being fed off, palatability to animals and perennial habits.

Because of the variation from this ideal it is necessary for the farmer to have some knowledge of the origin of the seed he proposes to plant.

With strains purchased direct from the producer he is probably familiar with the growth characteristics of the plants harvested, and may even have seen the actual crop itself. On the other hand, with grain purchased from the merchant, the position is somewhat different, and in order to safeguard against any risk, the farmer should, wherever possible, obtain certified seed.

The seed certification schemes that are being conducted throughout the Commonwealth and New Zealand, guarantee that the grain is true to type and harvested from plants of the most productive class. Therefore, although it may be more expensive, the purchase of certified seed can be recommended since it eliminates the risk of obtaining seed that will give rise to short lived or poor leaf producing plants.

Reverting to the question of local strains, the planting of seed harvested from the so-called native perennial rye-grass has much to recommend it, provided of course that the particular strain possesses the desirable growth characteristics. There are many areas in Adelaide Hills and the South-East that could be harvested with advantage, whilst the same position occurs in other States.

As these old pasture stands have been established for many years and are the result of independent seed importations, the type of plant in the different areas varies considerably.

Two years ago attention was drawn to plantings in the Inman and Back Valley districts where stands raised from seed secured from a Colac farm in Victoria appeared to possess very desirable characteristics in the matter of drought resistance, and ability to make strong growth in land of lower fertility than that in which perennial rye-grass usually does well. If this apparent improvement is inherited and not due to some accidental factor the strain would be of outstanding value to South Australia, since even in our higher rainfall country the summers are dry, whilst the soil is of relatively light texture and poor quality.

It was therefore decided to give the strain a trial over a wide range of conditions, and in 1936 the South Australian Committee of the Australian Dairy Council imported 50bush. of this seed for testing. It was distributed amongst 16 dairymen situated in different districts and planted on soil ranging from poor sand to peat.

In all cases a good germination resulted, but at this stage, that is to say after only one summer, it is not possible to express a definite opinion as to the value of the strain.

Where Hawkes Bay seed was planted in an adjoining field it compared very favourably, whilst all experimenters commented upon the palatability, the growth made in the winter and after each rain during the summer, and the lighter colour of the foliage on the plants obtained from the experimental seed.

At Nairne and Echunga where the crop was cut for hay, the rye-grass attained a height of 2½ft. and generally made very satisfactory development. It certainly has done well in light land in its first season and it remains to be seen how the strain withstands a normal summer.

A further series of plots has been planted this year, as another consignment of 20 bushels of seed has been secured from the same source. Therefore, at the conclusion of the present season we will be in a better position to make a definite statement as to the value of this strain for the average soil and climatic conditions obtaining in the higher rainfall areas of the State.

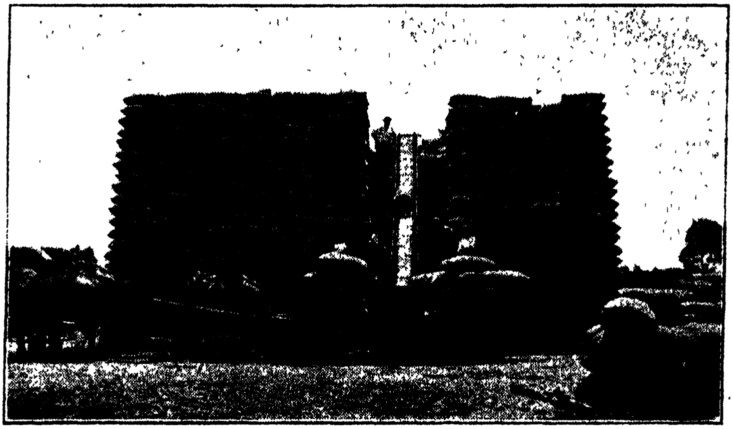
Throughout the world, perennial rye-grass is the most important grass variety and is included in the best pasture mixtures.

In South Australia we are compelled to plant Wimmera rye-grass, an annual fodder, in many districts, since in these localities the summer conditions are too severe for perennials.

To-day, there are numerous fields in which the pasture is almost entirely Subterranean clover, and where this is the case the inclusion of a grass of some kind or other would be a distinct advantage. Provided that the conditions permit, perennial rye-grass is to be preferred to Wimmera because of its perennial habits, the early growth in autumn and green picking provided throughout the summer. Experiments have shown that it can be successfully planted in much of the 24in. (and over) annual rainfall country and can be established without losing an appreciable amount of grazing in the first year.

The usual method is to till thoroughly the Subterranean clover field in the autumn, sometimes even a couple of strokes of the pasture harrows answering the purpose, and planting 8 to 10lbs. of perennial rye-grass seed to the acre in April or May according to the character of the season. Whilst some of the rye-grass may be crowded out because of the competition with the numerous clover plants, sufficient will establish to form a well-balanced pasture. Naturally the stand improves with age, but with normal seasonal conditions is quite good even in the first year, and has the added advantage of yielding a mixed foodstuff instead of one which is dominantly clover. The search for better strains of pasture varieties will continue, but there has been considerable advance made in the development of strain in fodders in recent years, and growers should take advantage of the certified seed that is now available.

Appreciable financial loss is associated with the planting of bad seed and even if the price for reliable seed is higher than that for uncertified grain, the elimination of risk in this direction is worth the extra money involved. Consequently attention to type and quality in pasture seeds is emphasised.



Wheat Stacks are larger because of Crop Competitions.

Wheat Growing in the Mallee

[A Record of the Chandos District Wheat Crop Competition, 1924 to 1936, by R. L. Griffiths, D.D.A., District Agricultural Adviser.]

The Chandos District Wheat Crop Competition is one of the two largest in South Australia, the other of equal importance, from the point of view of number of entries, being in the Midlands District. These two competitions have each had a total of over 800 entries since they began in 1924.

It is usual, at first, for farmers to enter such crop competitions entirely in a competitive spirit and with the object of comparing their own crops and farm methods with those of their neighbours and also, if possible, to win prizes. The advertising value of the competitions to their particular locality is also quite often recognised. It is only after a competition has been in existence for some time, particularly when judged over a period of years by the same judge, whose standards should remain the same from year to year, that the value of the records obtained is appreciated. In Chandos the first competition, in 1924, was judged by Mr. W. J. Spafford, now Director of Agriculture; in 1925 the judge was Mr. E. S. Alcock, District Agricultural Adviser, and all competitions since have been judged by the writer.

Crops entered for competition are among the best grown by the best farmers of the district and a comparison of the methods followed must provide a good guide to correct farm practice. It is recognised that such a guide may only be general because of seasonal variation, but a summary of the methods followed in growing over 800 of the best crops during 13 successive seasons might be almost a text-book of efficient farm methods.

The allotment of points for wheat crop competitions in South Australia is as follows:—

	Points.
Apparent yield	35
Freedom from weeds	25
Freedom from disease	20
Trueness to type	15
Evenness of crop	5
Total	100

Crop Inspection Day, Parrakie Agricultural Bureau.

These have been carefully arranged to allow good farm practices to get full credit, as well as the actual density and yield of the crop.

At the time of judging complete details are obtained of paddock history for five years with full particulars of cultivation and seeding methods. Thus a record, such as this, gives much knowledge of farm methods over a wide area, in contrast to that of farm experimental plots or farms, where results, though extremely valuable, can be local only.

Number and Distribution of Entries.

During six of the 13 years under review Chandos was the largest competition in South Australia, with a State record entry in 1928 of 137, which is 50 per cent. greater than any competition before or since. During another six years the Midlands competition had a greater number of entries, while in one year both competitions had an exactly similar number.

The sustained interest is a great credit to the committees of farmers responsible and has been aided by the organisation of local areas in each of several centres, *i.e.*, Pinnaroo, Parilla, Lameroo, Parrakie, Geranium and Jabuk, with the presentation of local prizes for the best crops in each centre, in addition to the general district awards.

A few of the entries have been local only. These have come from farmers on the Victorian side of the border at Pinnaroo, who use Pinnaroo as their business centre, but were doubtful of their eligibility to enter State-subsidised district competitions. A junior competition, also, was organised, with separate prizes for sons of farmers under 21 years of age who were doing the work on the farms. Unfortunately this has never received a very large number of entries. The actual number of entries each year has been as follows:—

CHANDOS WHEAT CROP COMPETITION.

Year.	No. of Entries.		Total.
	District.	Local and Junior.	
1924	63	1	64
1925	49	2	51
1926	67	—	67
1927	81	—	81
1928	137	—	137
1929	92	—	92
1930	61	8	69
1931	57	7	64
1932	46	4	50
1933	28	11	39
1934	36	3	39
1935	53	7	60
1936	22	3	25
Totals	792	46	838

An average of 64 entries per year.

It will be noted that during the last few years there has been a waning of interest, shown by reduced entries. This is directly due to the long depressed period, when rainfalls continued year after year below normal and the price of wheat was unprofitably low.

The distribution of entries over the various local centres has been:—

Chandos Crop Competition—Distribution of Entries.

	1924.	1925.	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	Total.
Pinnaroo	33	28	29	27	44	16	16	14	11	18	16	19	—	271
Parilla	15	11	16	17	23	11	17	17	11	6	7	18	6	175
Lameroo	16	12	22	23	36	13	11	9	9	8	9	9	11	188
Parrakie	—	—	—	—	1	11	1	10	8	5	5	10	6	57
Geranium and Jabuk .	—	—	—	14	33	41	24	14	11	2	2	4	2	147
	64	51	67	81	137	92	69	64	50	39	39	60	25	838

It will be noticed that Pinnaroo farmers who have suffered rather worse during the low rainfall period than those in some other parts have been very loyal to the competition until last year, when their local competition was cancelled, in spite of which they obtained the largest aggregate number of entries. With better rainfall years there is no doubt that Pinnaroo crops will again be hard to beat.

Lameroo and Parilla have shown consistent interest, while Geranium and Jabuk did very well from 1927 to 1932, and Parrakie during the more recent years.

Description of the Chandos District.

The county of Chandos is on the eastern side of the State, adjoining the Victorian border, along which its boundary runs for 65 miles. The total area of the county is approximately 2,400 square miles. Competition entries have not been strictly confined to county boundaries, a few coming from over the Victorian border and many from Parrakie, Geranium and Jabuk, which are on the western side in the county of Buccleuch. Nearly all entries were from the hundreds of Pinnaroo, Parilla, Bews, Allenby, Cotton, Price and Peake. The northern part of county Chandos is much more recently settled and has not only a lower rainfall, but a larger proportion of sandy soils, while the south, with a good rainfall, but still uncleared, includes much rough country and is the northern boundary of the so-called "Ninety Mile Desert," which eventually will be developed chiefly for the use of sheep.

This competition, then, has been confined to the centre part of country Chandos, with some country west of it, and includes a strip about 50 miles east and west from the Victorian border to Jabuk, and about 16 miles north and south, through the centre of which runs the Pinnaroo railway line.

Soils.

There is a considerable variation of soils in this area. The best agricultural land consists of red and grey to black clay loam flats with clay subsoils, which are capable of producing high wheat yields in good rainfall seasons, but fail badly during dry years. Some of these flats are hundreds of acres in area, others are much smaller. Dividing the flats are sandhills, chiefly in ridges running east and west, but sometimes with no definite direction. These have a poor quality surface soil, with clay subsoil at depths varying from a few inches to several feet. Although now cropped and, in fact, producing much of the wheat during the recent low rainfall period, they are of low fertility, subject to drift, and will be used eventually mostly as pasture land.

Supplement to the Journal of Agriculture, South Australia, June, 1937.]

Herd Testing Results

A Record of

1. Production figures, under Official test, of pure bred cows which completed their tests during the quarter ended 31st March, 1937.
2. Herd Testing Associations (not official) production figures for months January to March, 1937.
3. Annual production figures (not official) of the Southern Districts Herd Testing Association, 1936-37.

Supplement to the " Journal of Agriculture," South Australia, June, 1937.]

Official Herd Testing

In the three months ended March, 1937, the cows to finish their period of official test numbered 157. No less than 53 of them, however, ended their tests prematurely owing to sales, sickness, early dryings and other more or less common causes. The number to complete the full 273 days period was thus 104. But to refer back to the original 157 cows, it will be found, upon reference to the lists that follow, that the classification of these cows has been as under :—

Junior 2 years old	41
Senior 2 years old	19
Junior 3 years old	13
Senior 3 years old	10
Junior 4 years old	5
Senior 4 years old	12
Mature	57
	157

The numbers which reached or exceeded the standard butterfat output were :—

Junior 2 years old	25 cows	=	60·97	per cent.
Senior 2 years old	10 "	=	52·63	"
Junior 3 years old	8 "	=	61·53	"
Senior 3 years old	8 "	=	80·00	"
Junior 4 years old	4 "	=	80·00	"
Senior 4 years old	6 "	=	50·00	"
Mature	22 "	=	38·60	"
	83 "	=	52·86	"

MERITORIOUS COWS.

Junior Two.

	Lbs. Milk.	Average Test.	Lbs. Butterfat.
Mr. C. E. Smart's " Onkaparinga Joy "	7,279½	5·28	384·63
Mr. C. J. Morris' " Murray Glen Echo Triumph "	10,236	3·34	341·92

Senior Two.

Mr. E. L. Goode's " Ninyeri Bluebell "	6,854	5·53	379·40
Mr. A. B. A. Weckert's " Scrub View Dora "	7,160	5·11	365·95

Junior Three.

Mr. C. J. Morris' " Murray Glen Sylvia Beets "	13,156½	4·31	567·12
Mr. R. J. Laing's " Kirami Jennifer's Princess "	8,769	5·27	461·92

Senior Three.

Mr. E. W. Pfitzner's " Delma Noble Lotus "	7,614	6·04	459·71
Mr. E. O. Hancock's " Glen Belah Heather "	8,875½	4·59	407·06

MERITORIOUS COWS—*continued.*

	Lbs. Milk.	Average Test.	Lbs. Butterfat
JUNIOR FOUR.			
Messrs. E. and A. Nicholls " Kiama Primrose 2nd	9,082½	4·44	403·33
Mr. O. H. Woodward s " Navua Fascination "	6,701	5·95	398·89
SENIOR FOUR.			
Mr. J. A. J. Pfitzner's " Hampden Noble's Guitar "	7,617½	6·39	486·65
Mr. C. E. Smart's " Pella Madiera Kelly "	8,601	5·27	453·56
MATURE COWS.			
Mr. C. J. Morris' " Murray Glen Sylvia Topsy "	25,200	3·29	828·26
Mr. C. J. Morris' " Murray Glen Netherland Buttergirl "	17,055	4·26	726·37
Mr. C. J. Morris' " Murray Glen Griselda Tulip "	12,207	4·64	566·23

These particular figures of production should not be allowed to pass without special attention be drawn to a new record which has been established in South Australia by Mr. C. J. Morris' " Murray Glen Sylvia Topsy ", a mature Friesian cow, with 828·26lbs. butterfat to her credit. Mr. Morris is to be congratulated not only upon being the owner of this record-breaking cow, but upon being her breeder as well.

Supplement to the "Journal of Agriculture," South Australia, June, 1937.]

Pure Bred Cows which completed Official Test during

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
			JUNIOR TWO-YEAR-OLDS—	
54562	Onkaparinga Joy	C. E. Smart, Clarendon	Jersey	22/5/36
Not allotted	Murray Glen Echo Triumph	C. J. Morris, Monteith	Freisian	4/4/36
55655	Tuela Moss Pink	F. Coleman, Saddleworth	Jersey	21/6/36
Not allotted	Kiama Rose 4th	E. and A. Nicholls, Woodville	A.I.S.	8/4/36
52444	Dalkey Pearl's Jewel	G. D Oster, Balaklava	Jersey	28/4/36
53690	Lanacoona Viola	C. E. Verco, Mount Compass	"	4/4/36
52016	Brinkworth Jessica	C. C. T. Ottens, Brinkworth	"	19/4/36
Not allotted	Riverdale Lady Maud	Riverdale Friesian Stud, Murray Bridge.	Friesian	1/7/36
"	Kyby Topsy	Government Farm, Kybybolite	Ayrshire	12/6/36
49410	Marana Fascination	O. H. Woodward, Gilles Plains	Jersey	29/5/36
48553	Greenoaks Sweet May	W. A. Mueller, Ambleside	"	13/5/36
Not allotted	Ninyeri Star	E. L. Goode, Narrung	"	19/4/36
55099	Roseworthy Sciential 6th	Agricultural College, Roseworthy	"	21/4/36
55006	Rivington Tertia	J. W. Crompton, Victor Harbour	"	8/4/36
47439	Brinkworth Erica	C. C. T. Ottens, Brinkworth	"	2/5/36
Not allotted	Northfield Blanche	Inspector-General of Hospitals, Northfield	Ayrshire	22/4/36
"	Glen Belah Belle	E. O. Hancock, Andrews	"	15/5/36
50113	Pella Maranta Lotus	W P Eckermann, Eudunda	Jersey	11/4/36
53075	Gum Hill Floss 2nd	P. O. Schutz, Eudunda	"	26/6/36
52441	Dalkey Echo	G. D. Oster, Balaklava	"	2/5/36
54241	Morella Viola 5th	H R. Walsh, Mount Barker	"	15/5/36
17603	Northfield Lucy 3rd	Inspector-General of Hospitals, Northfield	A.I.S.	6/4/36
17600	Northfield Janets Sunflower 3rd	Inspector-General of Hospitals, Northfield	"	9/4/36
Not allotted	Ramilles Diamond	E. O. Hancock, Andrews	Ayrshire	14/5/36
54472	Ninyeri Pearl	E. L Goode, Narrung	Jersey	13/4/36
Not allotted	Kyby Rosandy	Government Farm, Kybybolite	Ayrshire	1/5/36
"	Ramilles Dot	E. O. Hancock, Andrews	"	14/5/36
17197	Long Flat Cinderella 9th	A. H. Spackman & Sons, Long Flat	A.I.S.	9/7/36
48550	Greenoaks Cunning May	W. A. Mueller, Ambleside	Jersey	27/4/36
Not allotted	Kyby Flame	Government Farm, Kybybolite	Ayrshire	14/5/36
17562	Newenham Poppy 2nd	J M. Irwin, Mount Barker	A.I.S.	9/6/36
Not allotted	Dale River Princess Sylvia	Riverdale Friesian Stud, Murray Bridge.	Friesian	23/9/36
"	Riverdale Lady Maud 2nd	Riverdale Friesian Stud, Murray Bridge.	"	14/9/36
"	Kyby Brilliance	Government Farm, Kybybolite	Ayrshire	15/4/36
17607	Northfield Wanda 2nd	Inspector-General of Hospitals, Northfield	A.I.S.	4/4/36
11991	Kiama Olive 9th	E. and A. Nicholls, Woodville	"	29/7/36
17598	Northfield Gem 2nd	Inspector-General of Hospitals, Northfield	"	11/4/36
17606	Northfield Tot 2nd	Inspector-General of Hospitals, Northfield	"	29/8/36
Not allotted	Riverdale Pride Dekol	Riverdale Friesian Stud, Murray Bridge.	Friesian	12/10/36
28735	Northfield Adriane	Inspector-General of Hospitals, Northfield	Ayrshire	14/9/36
17564	Newenham Vera 2nd	J. M. Irwin, Mount Barker	A.I.S.	11/1/37
			SENIOR TWO-YEAR-OLDS—	
54469	Ninyeri Bluebell	E. L. Goode, Narrung	Jersey	17/6/36
Not allotted	Scrub View Dora	A. B. A. Weckert, Brinkworth	"	11/5/36
43543	Crofton Alanna	H. and A. Bohme, Balhannah	"	21/5/36
54470	Ninyeri Heather Bell	E. L. Goode, Narrung	"	3/5/36
28420	Glen Belah Sylvia	E. O. Hancock, Andrews	Ayrshire	8/4/36
50109	Pella Dianthus	C. E. Smart, Clarendon	Jersey	8/4/36
43570	Cumberland Beauty	L. W. Frost, Saddleworth	"	12/4/36
44206	Greenoaks Lotus	W. A. Mueller, Ambleside	"	4/6/36
46954	Alexandra Jessica	A. Kelly, Milang	"	27/4/36
43581	Cumberland Lassie	L. W. Frost, Saddleworth	"	4/7/36
12265	Liberton Twilight	P. J. A. Braendler, Ambleside	A.I.S.	2/6/36
52762	Gambier Viola 3rd	T. H. Bartlett, Moorak	Jersey	23/5/36
Not allotted	Wybalenna Primrose	P. J. A. Braendler, Ambleside	A.I.S.	3/4/36
"	Riverdale Colantha Priscilla	Riverdale Friesian Stud, Murray Bridge.	Friesian	18/8/36
52733	Five Gums Goldie 8th	T. H. Bartlett, Moorak	Jersey	2/8/36
54145	Mira Chana Lily	H. B. Peters, Mount Compass	"	23/8/36
55098	Roseworthy Scient	Agricultural College, Roseworthy	"	23/7/36
Not allotted	Anama Netherland Mermaid	W. Hawker, Central Bungaree	Friesian	7/10/36
"	Five Gums Goldie 7th	T. H. Bartlett, Moorak	Jersey	6/11/36
			JUNIOR THREE-YEAR-OLDS—	
Not allotted	Murray Glen Sylvia Beets	C. J. Morris, Monteith	Friesian	12/4/36
44717	Kirami Jennifer's Princess	R. J. Laing, Gumeracha	Jersey	16/5/36
44208	Greenoaks Sweet Kate	W. A. Mueller, Ambleside	"	7/6/36
50413	Rivington Winnie	J. W. Crompton, Victor Harbour	"	8/4/36
43188	Brinkworth Regina	C. C. T. Ottens, Brinkworth	"	11/4/36
43187	Brinkworth Lupin	C. C. T. Ottens, Brinkworth	"	15/4/36
44719	Kirami Rosy Morn	R. J. Laing, Gumeracha	"	16/6/36
44267	Hampden Gamboge's Sybil	J. A. J. Pfitzner, Hampden	"	26/6/36

the period 1st January to 31st March, 1937

Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
BUTTERFAT STANDARD, 230LBS.						
1 11 27	7,279½	5·28	384·63	273	Brighton King 75th	—
1 10 17	10,236	3·34	341·92	273	Murray Glen Griselda Beets	—
1 11 14	6,501	4·96	322·56	273	Sweet Haven Mercedes Chief	—
2 0 7	8,574	3·65	312·79	273	Kiama Champion Lad	—
1 10 20	5,266½	5·45	287·03	273	Hampden Olive's Aristocrat	—
1 7 24	4,933½	5·79	285·61	273	Werribee Masterstroke	—
1 5 26	4,464	6·33	282·45	273	Havec Star	—
1 10 28	8,355	3·38	282·29	210	Brundee Charles President	Owner ceased testing
2 1 15	7,293	3·84	279·96	273	Gowrie Park Leyland	—
2 0 0	4,980	5·62	279·83	273	Glen Ewin Morn's Masterboy	—
2 0 2	4,882½	5·70	278·34	273	Alinda Noble Combination	—
2 2 7	5,064	5·41	274·08	273	Ninyeri Earl	—
2 5 28	4,416	6·16	272·09	273	Roseworthy Sprite	—
2 0 18	5,115	5·20	265·81	273	Baxter of Banyule	—
2 1 26	4,569	5·73	261·95	273	Havec Star	—
2 1 5	6,469½	4·03	260·43	273	Grand View Begonia Hot Stuff	—
1 10 10	5,898	4·41	260·15	273	Glen Belah Reuben	—
2 0 12	4,822½	5·34	257·64	273	Melvin Noble	—
1 8 17	4,571	5·53	252·60	273	Pella Graceful Lad	—
1 9 12	4,612½	5·31	244·87	273	Hampden Olive's Aristocrat	—
1 10 14	5,286	4·55	240·38	273	Morella Bill	—
2 4 20	6,019½	3·96	238·31	273	Illawarra Violet Miller	—
2 3 9	6,006	3·91	234·77	273	Illawarra Violet Miller	—
2 3 20	5,238	4·46	233·39	273	Gowrie Park Dairyman	—
2 4 11	4,563½	5·08	231·80	273	Ninyeri Chief	—
2 2 3	5,191½	4·40	228·23	273	Gowrie Park Scottish Dandy	—
1 11 29	4,399½	5·00	220·17	273	Gowrie Park Dairyman	—
1 10 29	4,800	4·40	211·00	240	Long Flat Mayflower Limelight	†
1 11 18	4,002½	5·21	208·46	273	Alinda Noble Combination	—
2 1 9	4,603½	4·25	195·71	273	Gowrie Park Leyland	—
2 0 20	5,394	3·35	180·64	273	Kiama Joffre	—
1 10 23	4,995	3·43	171·52	120	Brundee Chas President	Owner ceased testing
1 10 4	4,935	3·30	162·84	120	Brundee Chas President	Owner ceased testing
1 11 24	3,762	4·31	162·12	273	Gowrie Park Leyland	—
2 0 9	3,778½	3·49	131·97	273	Northfield Janet Royal	—
2 5 4	4,095	3·17	129·70	150	Kiama Pembroke	Sold
2 3 11	3,816	3·29	125·68	273	Illawarra Violet Miller	—
1 11 15	2,655	3·84	101·92	150	Illawarra Violet Miller	Withdrawn
1 10 27	3,135	3·09	97·02	90	Brundee Charles President	Owner ceased testing
1 5 18	1,740	3·89	67·68	120	Fernvale Top Notch	Dry
2 2 7	810	4·26	34·56	30	Mayflower's Monarch of Park View	Withdrawn
BUTTERFAT STANDARD, 250LBS.						
2 9 6	6,854	5·53	379·40	273	Hampden Mayflower's King	—
2 11 4	7,160	5·11	365·95	273	Scrub View Twylish Lad	—
2 10 15	7,240½	4·95	358·48	273	Glen Ewin Morn's Starbright	—
2 9 15	7,038	5·04	354·67	273	Ninyeri King	—
2 9 5	8,788½	4·02	353·53	273	Kyby Robin	—
2 11 29	7,099½	4·68	332·54	273	Pella Masterpiece	—
2 11 20	6,391½	5·18	331·39	273	Para Vale Prince 2nd	—
2 9 23	5,716½	5·34	305·32	273	Dalebank Commander 2nd	—
2 8 26	6,036	4·78	288·82	273	Hampden Queen's Repeater	—
2 9 4	5,040	5·36	270·14	240	Para Vale Prince 2nd	Sold
2 6 8	6,205½	3·98	247·15	273	Viscount 2nd of East View	—
2 9 28	4,350	5·12	222·65	240	Hampden Olive's King	Dry
2 10 21	5,518½	3·89	214·92	273	Wangara Sunflower's Limelight	—
2 10 8	6,315	3·33	209·99	150	Cordyline Colantha Hero	Owner ceased testing
2 7 16	3,945	4·79	188·91	210	Werribee Alanda	Dry
2 9 10	3,105	6·05	187·96	150	Mira Chana Masterlark	Sold
2 11 11	3,600	4·68	168·34	180	Roseworthy Sprite	Withdrawn
2 10 25	3,645	3·78	137·69	90	Anama Netherland Neptune	Sold
2 11 2	2,640	4·75	120·53	120	Werribee Alanda	Owner ceased testing
BUTTERFAT STANDARD 270LBS.						
3 4 28	13,156½	4·31	567·12	273	Murray Glen Griselda Beets	—
3 2 7	8,769	5·27	461·92	273	Kangaroo Flat Merry Mike	—
3 0 8	7,822½	5·46	427·17	273	Pella Cleg Kelly	—
3 0 22	8,221½	5·14	422·25	273	Baxter of Banyule	—
3 0 7	5,967	5·89	351·26	273	Havec Star	—
3 1 18	7,033½	4·94	347·11	273	Havec Star	—
3 1 9	6,232½	5·49	342·12	273	Glen Ewin Contance's Masterman	—
3 2 29	5,747½	5·80	333·11	273	Woodside Agatha's Gamboge	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
			Junior-Three-Year-Olds—	
Not allotted	Northfield Pride 2nd	Inspector-General of Hospitals, Northfield	A.I.S.	12/4/36
53687	Lallawa Diana Firefly	J. F. Dodd, Meningie	Jersey	12/6/36
28648	Kyby Bloom	Government Farm, Kybybolite	Ayrshire	13/4/36
10438	Dunleith Viola 2nd	Dunleith Pastoral Co., Ashbourne	A.I.S.	5/11/36
28644	Kyby Annette	Government Farm, Kybybolite	Ayrshire	15/7/36
			Senior Three-Year-Olds—	
39503	Delma Noble Lotus	E. W. Pfitzner, Eudunda	Jersey	19/5/36
27231	Glen Belah Heather	E. O. Hancock, Andrews	Ayrshire	30/3/36
46032	Roseworthy Glimmer's Maid	Agricultural College, Roseworthy	Jersey	2/6/36
43580	Cumberland Countess	L. W. Frost, Saddleworth	"	14/7/36
11996	Kiama Robin 5th	E. and A. Nicholls, Woodville	A.I.S.	17/5/36
14417	Tabbagong Dairymaid 16th	J. M. Irwin, Mount Barker	"	27/4/36
Not allotted	Dale River Silver Mercedes	Riverdale Friesian Stud, Murray Bridge.	Friesian	16/8/36
27879	West Kilbride Lassie	Inspector-General of Hospitals, Northfield	Ayrshire	1/5/36
Not allotted	Gambier Princess Olive	T. H. Bartlett, Moorak	Jersey	25/8/36
12178	Lake View Royal's Melba	J. M. Irwin, Mount Barker	A.I.S.	13/8/36
			Junior Four-Year-Olds—	
8282	Kiama Primrose 2nd	E. and A. Nicholls, Woodville	A.I.S.	12/5/36
41236	Navua Fascination	O. H. Woodward, Gilles Plains	Jersey	29/5/36
4910	Riverdale Netherland Indi	Riverdale Friesian Stud, Murray Bridge.	Friesian	16/5/36
45562	Ontario Lady Marge	T. B. Brooks, Clarendon	Jersey	23/6/36
8281	Kiama Olive 6th	E. and A. Nicholls, Woodville	A.I.S.	16/5/36
			Senior Four-Year-Olds—	
40155	Hampden Nobles Guitar	J. A. J. Pfitzner, Hampden	Jersey	2/4/36
34527	Pella Madiera Kelly	C. E. Smart, Clarendon	"	28/4/36
43583	Cumberland Molly	L. W. Frost, Saddleworth	"	13/6/36
34690	Wooroora Waffles	A. B. Sieber, Eudunda	"	4/4/36
8283	Kiama Robin 4th	E. and A. Nicholls, Woodville	A.I.S.	17/5/36
8487	Northfield Janet's Sunflower	Inspector-General of Hospitals, Northfield	"	16/6/36
Not allotted	Riverdale Maud Echo	Riverdale Friesian Stud, Murray Bridge.	Friesian	10/8/36
"	Lallawa Chieftain's Diana	J. F. Dodd, Meningie	Jersey	13/4/36
3778	Glenlea Lilac	E. T. Vinall, Brighton	Guernsey	4/4/36
8497	Northfield Sunflower 2nd	Inspector-General of Hospitals, Northfield	A.I.S.	11/6/36
41050	Mira Chana Sheila	H. B. Peters, Mount Compass	Jersey	13/7/36
8491	Northfield Primrose	Inspector-General of Hospitals, Northfield	A.I.S.	8/4/36
			Mature Cows—	
3657	Murray Glen Sylvia Topsy	C. J. Morris, Monteith	Friesian	14/6/36
3652	Murray Glen Netherland Buttergirl	C. J. Morris, Monteith	"	31/5/36
3646	Murray Glen Griselda Tulip	C. J. Morris, Monteith	"	24/4/36
34486	Ontario Kitty	C. E. Smart, Clarendon	Jersey	2/4/36
32233	Penrith Fascination	O. H. Woodward, Gilles Plains	"	26/5/36
29115	Belgonia Clementine	A. Kelly, Milang	"	27/4/36
34610	Oakhill Pimpernel 5th	Mrs. E. M. Johns, South Plympton	"	16/4/36
4163	Murray Glen Flower Queen	C. J. Morris, Monteith	Friesian	15/6/36
31038	Pella Carnation	C. E Smart, Clarendon	Jersey	14/4/36
5368	Kiama Pembroke's Olive	E. and A. Nicholls, Woodville	A.I.S.	1/4/36
34629	Brinkworth Rhodora	C. C. T. Ottens, Brinkworth	Jersey	8/4/36
12766	Mount Annan Cowrie	J. M. Irwin, Mount Barker	A.I.S.	28/6/36
40103	Greenoaks Sweetbread	W. A. Mueller, Ambleside	Jersey	15/4/36
27319	Gowrie Park Adriane	Inspector-General of Hospitals, Northfield	Ayrshire	17/6/36
23629	Roseworthy Sunbeam	Agricultural College, Roseworthy	Jersey	30/3/36
3653	Murray Glen Netherland Princess	C. J. Morris, Monteith	Friesian	18/5/36
41890	Roseworthy Rose	Agricultural College, Roseworthy	Jersey	7/4/36
24990	Brinkworth Myra	C. C. T. Ottens, Brinkworth	"	18/5/36
31132	Gum Hill May	P. O. Schutz, Eudunda	Jersey	22/5/36
4903	Riverdale Colantha Rosebud	Riverdale Friesian Stud, Murray Bridge.	Friesian	14/5/36
31083	Havec Tulip	Mrs. C. E. Mayger, Kapunda	Jersey	3/5/36
5367	Kiama Olive 5th	E. and A. Nicholls, Woodville	A.I.S.	10/5/36
27368	Hazelbrook Lorna	J. N. Reid, Oakbank	Ayrshire	9/4/36
8496	Northfield Royal Sunflower II.	Inspector-General of Hospitals, Northfield	A.I.S.	16/6/36
38696	Ardmeen Jennifer	R. J. Laing, Gumeracha	Jersey	6/4/36
4213	Riverdale Johanna Mercedes	Riverdale Friesian Stud, Murray Bridge.	Friesian	1/9/36
25559	West Kilbride Lavender	Inspector-General of Hospitals, Northfield	Ayrshire	4/6/36
5398	Lake View Melba 8th	J. M. Irwin, Mount Barker	A.I.S.	6/5/36

Supplement to the " Journal of Agriculture," South Australia, June, 1937.]

OFFICIAL TEST—*continued.*

Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	%	Lbs.			
BUTTERFAT STANDARD 270LBS.—*continued.*						
3 7 11	5,784	4·39	253·95	273	Northfield Janet's Success	—
3 0 8	4,215	5·25	221·34	240	Dalebank Mystifier	†
3 1 0	5,386½	3·97	214·05	273	Gowrie Park Leyland	—
3 3 21	3,480	3·57	124·07	120	May Lad 2nd of Illawarra	Withdrawn
3 1 19	2,850	4·01	114·32	180	Gowrie Park Leyland	Dry
BUTTERFAT STANDARD 290LBS.						
3 9 29	7,614	6·04	459·71	273	Dalebank Noble Duke	—
3 7 14	8,875½	4·59	407·06	273	Kyby Robin	—
3 10 13	6,271½	6·27	393·46	273	Roseworthy Pretty Duke	—
3 9 6	7,005	5·50	385·05	240	Silver Lad of Eudunda	Sold
3 9 16	8,790	3·95	346·86	273	Pembroke of Kiama	—
3 9 4	7,980	4·15	330·96	240	Park View Reward II.	†
3 7 6	9,930	3·28	326·14	150	Eco Sylv King Pontiac	Owner ceased testing
3 10 7	7,533	4·23	318·32	273	Oakbank Classical	—
3 11 7	4,875	5·29	257·84	210	Hampden Olive's King	Owner ceased testing
3 7 13	6,015	3·94	237·19	210	Lake View Royal	Withdrawn
BUTTERFAT STANDARD 310LBS.						
4 5 28	9,082½	4·44	403·33	273	Viscount of East View	—
4 2 2	6,701	5·95	398·89	273	Wistaria Laddie	—
4 5 9	11,490	3·43	394·06	240	Riverdale Paul Indi	Owner ceased testing
4 0 7	6,580½	5·37	353·31	273	Dalebank Viola's Duke	—
4 5 24	7,212	4·03	290·80	273	Viscount of East View	—
BUTTERFAT STANDARD 330LBS.						
4 6 20	7,617½	6·39	486·65	273	Bellefaire Blonde's Aristocrat	—
4 10 22	8,601	5·27	453·56	273	Werribee Combination	—
4 9 23	7,900½	5·73	452·86	273	Silver Lad of Eudunda	—
4 8 13	8,534½	5·28	450·87	273	Delma Butter King	—
4 8 22	8,606	3·94	338·97	273	Pembroke of Greyleigh	—
4 9 7	8,646	3·87	334·19	273	Janets Royal of Northfield	—
4 10 9	8,430	3·44	289·70	180	Eco Sylv King Pontiac	Owner ceased testing
4 8 24	5,445	5·27	286·05	240	Chieftain 2nd of Dalebank	†
4 10 18	4,717½	5·18	244·29	273	Glenlea Hilda's Valour 2nd	—
4 10 8	6,304½	3·55	224·36	273	Melba's Limelight of Wangara	—
4 9 1	3,555	6·20	220·59	210	Timbungalung Larkspur's Masterlark	Sold
4 7 18	5,917½	3·42	202·67	273	Janet's Royal of Northfield	—
BUTTERFAT STANDARD 350LBS.						
8 1 1	25,200	3·29	828·26	273	River Glen Lord Echo Griselda	—
7 8 7	17,055	4·26	726·37	273	Longbeach Netherland King II.	—
6 8 20	12,207	4·64	566·23	273	River Glen Lord Echo Griselda	—
6 8 7	8,043	5·68	457·15	273	Cherry's Twylish of Para Wirra	—
6 9 4	6,970½	6·40	446·10	273	Raby Result	—
8 3 21	7,948½	5·61	445·62	273	Aerial of Banyule	—
5 10 10	6,907½	6·27	433·42	273	Carnation's Lad of Dalebank	—
5 3 12	10,990½	3·92	431·89	273	Murray Glen Netherland King	—
5 7 11	9,057	4·68	424·05	273	Dalebank Noble Duke	—
6 3 29	10,360	4·09	423·81	273	Pembroke of Greyleigh	—
5 10 15	7,697	5·20	400·07	273	General Chris of Penrhyn	—
5 9 2	10,166	3·89	395·44	273	Pet's Belmont of Kiama	—
6 2 26	7,369½	5·34	393·62	273	Dalebank Commander II.	—
6 9 14	9,462	4·15	392·64	273	Scottish Hero of Gowrie Park	—
9 7 13	7,808	5·01	391·17	273	Courtier of Dalebank	—
7 6 5	11,302½	3·36	379·35	273	Longbeach Netherland King II.	—
5 1 28	6,652	5·69	378·83	273	Roseworthy Templar	—
8 2 25	6,775½	5·49	372·09	273	General Chris of Penrhyn	—
6 8 13	6,549	5·62	367·77	273	Hampden Carnation Lad	—
6 9 19	10,230	3·49	357·45	240	Cordyline Colantha Hero	Owner ceased testing
7 0 19	6,990	5·03	351·82	240	Hampden Carnation Lad	Owner ceased testing
5 4 0	9,019½	3·89	350·64	273	Pembroke of Greyleigh	—
5 7 10	8,943	3·90	348·66	273	Beleura Federal	—
5 1 7	8,812½	3·82	336·34	273	Janet's Royal of Northfield	—
5 4 18	6,246	5·38	336·09	273	Wooroora Starbright's Premier	—
9 6 11	9,870	3·39	334·42	150	Cordyline Colantha Hero	Owner ceased testing
6 10 0	7,792½	4·23	330·01	273	Angle Farm Progress	—
5 7 29	8,697	3·67	318·79	273	Beauty's Royal of Lake View	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
				MATURE COWS—
Not allotted	West Kilbride Loleta	Inspector-General of Hospitals, Northfield	Ayrshire	19/5/36
2125	Glenlea Fi Fi 2nd	E T. Vinall, Brighton	Guernsey	14/6/36
2345	Northfield Blossom 2nd	Inspector-General of Hospitals, Northfield	A.I.S.	28/4/36
17880	Lucy 2nd of Toora	Inspector-General of Hospitals, Northfield	"	25/6/36
37634	Five Gums Linaria 2nd	T. H. Bartlett, Moorak	Jersey	2/6/36
15854	Carracoorte Blanche 4th	Inspector-General of Hospitals, Northfield	Ayrshire	1/4/36
26519	Kyby Brilliant	Government Farm, Kybybolite	"	4/5/36
1758	Glenlea Fi Fi	E. T. Vinall, Brighton	Guernsey	8/6/36
5374	Kiama Sultan's Beauty	E. and A. Nicholls, Woodville	A.I.S.	8/5/36
33593	Brookfield Verbena 18th	T. H. Bartlett, Moorak	Jersey	2/7/36
Not allotted	Preston Silky	T. H. Bartlett, Moorak	"	21/8/36
3928	Brundee Margosa Dekol	Riverdale Friesian Stud, Murray Bridge.	Friesian	28/9/36
2252	Riverdale Colantha Plum	Riverdale Friesian Stud, Murray Bridge.	"	26/10/36
29020	Glenalvie Sweet Dinah	T H. Bartlett, Moorak	Jersey	12/7/36
4213	Riverdale Johanna Griselda	Riverdale Friesian Stud, Murray Bridge	Friesian	30/6/36
33597	Willis Vale Briar Rose	T. H. Bartlett, Moorak	Jersey	12/6/36
20849	Roseworthy Princess 21st	Agricultural College, Roseworthy	"	20/7/36
26518	Kyby Ailsa	Government Farm, Kybybolite	Ayrshire	28/9/36
45011	Maiwand Viola 2nd	T H. Bartlett, Moorak	Jersey	21/9/36
31104	Hampden Lady Olive	J. A J Pfitzner, Hampden	"	20/7/36
37632	Five Gums Fragrance	T. H. Bartlett, Moorak	"	1/9/36
31125	Roseworthy Princess 36th	Agricultural College, Roseworthy	"	22/7/36
32938	Yanoc Vale Lady	T. H Bartlett, Moorak	"	15/9/36
32934	Yarroc Vale Amy	T. H. Bartlett, Moorak	Jersey	23/9/36
8692	Riverglen Sylvia Pietertje	Riverdale Friesian Stud, Murray Bridge.	Friesian	13/10/36
Not allotted	Talmont Stella	E O. Hancock, Andrews	Ayrshire	5/11/36
24861	Ferden Lady Beth	O. H. Woodward, Gilles Plains.	Jersey	16/9/36
18369	Northfield Royal Sunflower.	Inspector-General of Hospitals, Northfield	A.I.S.	25/10/36
28163	Morella Belle 3rd	E. L. Goode, Narrung	Jersey	0/12/36

N.B.—Cows marked thus † should have been submitted to a 10th test,

OFFICIAL TEST—*continued.*

Age at Calving. Y. M. D.	Total Milk. Lbs.	Average Test. %	Total Butterfat. Lbs	Days Tested.	Sire.	Remarks.
BUTTERFAT STANDARD, 350LBS.—*continued.*						
7 8 19	7,126½	4·44	316·20	273	West Kilbride Marquis	—
8 2 5	6,268½	4·95	310·07	273	Glenlea Hilda's Valour II.	—
7 5 29	6,999	4·34	303·70	273	Muirhead of Ben Lomond	—
8 8 14	7,860	3·84	301·62	273	Iris 5th's Superb of Toora	—
5 11 28	5,625	5·35	300·76	240	Staghorn Clementine's Masterpiece II.	†
10 6 21	7,210	3·95	285·02	273	Mab's Pride of Gleneira	—
5 0 29	6,457½	4·39	283·39	273	Gowrie Park Scottish Dandy	—
9 0 12	6,335	4·45	281·69	273	Glenlea Vera's Valour II.	—
6 8 13	7,780½	3·53	274·61	273	Sultan of East View	—
6 8 4	5,310	5·14	273·20	240	Sweetbread's Duke of Glen Iris	†
7 1 6	6,270	4·29	268·90	210	Preston Pretty King	Owner ceased testing
5 4 28	6,795	3·70	251·25	120	Brundee Rock's Dekol	Owner ceased testing
13 3 12	5,070	4·75	240·73	90	Cordyline Colantha Hero	Owner ceased testing
6 6 15	4,560	5·24	238·95	240	Werribee Fancy Masterpiece	Owner ceased testing
9 4 10	6,885	3·36	231·48	210	Cordyline Colantha Hero	Owner ceased testing
7 9 12	4,455	5·01	223·17	210	Camellia's King of Willis Vale	Dry
10 7 26	4,515	4·89	220·75	180	King Solomon of Dalebank	Withdrawn
5 1 10	4,515	4·88	220·45	180	Loyalty of Bridge View	Dry
6 1 28	5,010	4·37	218·86	180	Duke of Belgonia	Owner ceased testing
6 9 9	4,425	4·67	206·64	180	Mayflower's Lad of Hampden	Withdrawn
5 11 29	4,635	4·35	201·49	180	Staghorn Clementine's Masterpiece II.	Dry
7 8 17	3,735	5·35	199·66	180	Roseworthy Twylish	Withdrawn
7 2 19	4,350	4·47	194·50	180	Yarroc Vale Twylish Peer	Owner ceased testing
6 3 29	4,230	4·33	183·33	180	Yarroc Vale Twylish Peer	Owner ceased testing
8 7 20	5,145	3·37	173·60	90	Lucerndale Paul Indi	Owner ceased testing
7 0 4	3,195	4·52	144·30	90	Beleura Captain	Sold
8 6 19	2,505	4·50	112·65	90	Werribee Combination	Withdrawn
8 6 9	2,265	3·28	74·33	60	Royals Success of Arrawatta	Dead
8 7 0	1,410	4·06	57·20	60	Anemone's Chief of Morella	Withdrawn

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but were not, hence their lactation periods have been closed at 240 days.

Supplement to the " Journal of Agriculture," South Australia, June, 1937.]

Herd Testing Associations.

These Associations, of which, at the end of March, 1937, there were five established units in South Australia, are composed of dairy farmers whose herds are mainly grade animals, with here and there a few pure breds. Needless to say, dairymen who place their cows under systematic test are men of vision, and comprise some of the most progressive dairy herd owners of the State. They realise the importance of testing for productivity, and that without the information gained therefrom, it is impossible for them to separate the good cows from the bad.

The rules of Association testing differ materially, in some ways, from the rules of Official testing. Under the latter scheme the normal maximum period of testing is 273 days, yet under the former scheme it is not uncommon for tests to extend to as long as a 319 day period.

Herd average production figures under Association rules are computed by dividing total output by the whole of the cows, irrespective of whether dry or in milk ; this practice, of course, does not always apply when estimating herd averages under Official rules. Probably, however, the main point of difference between the two sets of rules is that whereas under the Official scheme cows must be stripped out under supervision at the milking immediately preceding the twenty four hours of test, no such requirement is met with under Association rules.

Production figures obtained from Association testing are intended chiefly for the use of the owners of the cows, and are regarded by the Department of Agriculture as Unofficial.

NARRUNG HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1937.

Herd No	No. of Cows in Herd.	No of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during January.	Per Cow during January	Per Cow October to January.	Per Herd during January.	Per Cow during January.	Per Cow October to January.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C	38·23	34·48	25,748½	673·51	3,154·75	1,369·23	35·82	164·07	5·32
5/R	62·87	49·90	28,082½	456·22	2,027·08	1,200·21	19·09	86·60	4·18
5/Ee	17	17	12,229½	719·38	2,601·80	590·84	34·76	130·13	4·83
5/Xx	22	17·87	9,802	445·54	2,123·62	510·21	23·19	107·64	5·21
5/Yy	10	7·55	2,136½	213·65	1,437·29	121·44	12·14	78·24	5·68
5/Aaa	20	17·61	8,808½	440·43	2,157·31	420·98	21·05	107·91	4·78
5/Bbb	16	15·81	4,353½	272·09	2,096·57	237·20	14·83	109·32	5·45
5/Jjj	26	26·06	4,890½	188·09	1,809·58	325·64	12·52	108·29	6·66
5/Aa	19	14 06	10,765	566·58	2,414·21	491·24	25·85	105·33	4·56
5/Lll	12·87	11·58	8,170	634·81	2,719·61	345·24	26·83	120·51	4·23
5/Rr	23	17·10	8,721½	379·19	1,730·65	473·76	20·60	95·69	5·43
5/Nnn	22	18 90	12,725	578 41	2,726·87	678·38	30·84	135·81	5·33
5/Ooo	21	20·26	23,772	1,132·00	3,739 37	922·52	43·93	154·21	3·88
5/Ppp	28·65	23 71	11,460	400·00	2,485·59	483·87	16·89	102·01	4·22
5/Rrr	10·23	8·61	4,641	453·65	1,894·94	233·67	22·84	96·69	5·03
5/Y	24·06	19·55	14,517	603·36	2,672·10	618·38	25·70	121·45	4·26
5/Sss	24	19·87	8,436½	351·52	1,643·62	427·94	17·83	94·21	5·07
5/M	19·68	14·81	8,887	451·57	2,506·58	450·45	22·89	125·27	5·07
5/K	42	22·45	12,532	298·38	1,703·62	662·52	15·77	94·00	5·29
5/F	13 13	12·87	8,194½	624·10	2,750·76	346·60	26·40	118·73	4·23
5/Ttt	28·71	25·19	10,671½	371·70	1,883·99	588·35	20·49	102·86	5·51
5/Vvv	24	22·68	13,438½	559·94	1,836·48	669·12	27·88	89·89	4·98
Means	23·84	19·91	11,526·50	483·54	2,282·59	553·08	23·20	112·70	4·80

Supplement to the "Journal of Agriculture," South Australia, June, 1937.]

NARRUNG HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February	Per Cow during February.	Per Cow October to February.	Per Herd during February.	Per Cow during February.	Per Cow October to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ...	39·36	25·54	17,443	443·16	3,597·91	980·92	24·92	188·99	5·62
5/R .	57	43·82	23,541	413·00	2,440·08	1,023·13	17·95	104·55	4·35
5/Ee . . .	17	17	9,506	559·18	3,160·98	535·75	31·51	161·64	5·64
5/Xx	22	15·75	7,658½	348·11	2,471·73	407·58	18·53	126·17	5·32
5/Yy	10	5·04	3,258	325·80	1,763·09	167·88	16·79	95·03	5·29
5/Aaa	20	17·14	8,408	420·40	2,577·71	443·53	22·18	130·09	5·28
5/Bbb	16	9·93	2,955	184·69	2,281·26	148·65	9·29	118·61	5·03
5/Jjj . .	26	8	3,752	144·31	1,953·89	208·60	8·02	116·31	5·56
5/Aa	19	18·07	13,100	689·47	3,103·68	601·08	31·64	136·97	4·59
5/Lll . .	12·96	10·89	5,766½	444·96	3,164·57	247·03	19·06	139·57	4·28
5/Rr . .	23	14·75	6,279	273·00	2,003·65	361·56	15·72	111·41	5·76
5/Nnn ..	22·64	16·86	9,209	406·75	3,133·62	457·71	20·22	156·03	4·07
5/Ooo . .	21	20·21	20,454	974·00	4,713·37	867·28	41·30	195·51	4·24
5/Ppp .	29	22	10,424½	359·47	2,845·06	423·38	14·60	116·61	4·06
5/Rrr .	9	8·29	3,525½	391·72	2,286·66	184·76	20·53	117·22	5·24
5/Y .	25·50	19·54	13,126	514·74	3,186·84	616·79	24·19	145·64	4·70
5/Sss ..	24	17·11	6,751	281·31	1,924·93	369·99	15·42	109·63	5·48
5/M . . .	20	15·07	12,903	645·15	3,151·73	636·14	31·81	157·08	4·93
5/K	41·64	20·25	11,318	271·80	1,975·42	587·16	14·10	108·10	5·19
5/F . .	13	8·82	4,968½	382·19	3,132·95	215·04	16·54	135·27	4·33
5/Ttt .	29·61	23·18	8,871½	299·61	2,183·60	497·49	16·80	119·66	5·61
5/Uuu .	24	22·86	11,124	463·50	2,299·98	574·69	23·95	113·84	5·17
Means . . .	23·71	17·28	9,742·84	410·84	2,716·29	479·82	20·23	132·91	4·92

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat			Average Test.
			Per Herd during March.	Per Cow during March	Per Cow October to March	Per Herd during March	Per Cow during March	Per Cow October to March	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C.... . .	40	22·39	15,792	394·80	3,992·71	839·53	20·99	209·98	5·32
5/R . . .	34·90	29	16,700	478·51	2,918·59	731·56	20·96	125·51	4·38
5/Ee	17	16·97	7,880½	463·56	3,624·54	483·17	28·42	190·06	6·13
5/Xx	22	16·23	6,335½	287·98	2,759·71	359·85	16·36	142·53	5·68
5/Yy	10	6·16	2,924½	292·45	2,055·54	155·44	15·54	110·57	5·32
5/Aaa	19·39	14·42	5,902	304·38	2,882·09	315·04	16·25	146·34	5·34
5/Bbb	16	7·58	1,674	104·62	2,385·88	95·52	5·97	124·58	5·71
5/Jjj	25·55	7·52	3,159½	123·66	2,077·55	192·95	7·55	123·86	6·11
5/Aa	19	15·97	10,174	535·47	3,639·15	500·18	26·33	163·30	4·92
5/Lll.	18	9·61	4,024	309·54	3,474·11	191·25	14·71	154·28	4·75
5/Rr	23·77	15·16	6,173	259·69	2,263·34	341·78	14·38	125·79	5·54
5/Nnn	24	17·55	8,652	360·50	3,494·12	476·97	19·87	175·90	5·51
5/Ooo	21	19·29	17,258	821·81	5,535·18	736·95	35·09	230·60	4·27
5/Ppp	29	20·58	7,445	256·72	3,101·78	322·77	11·13	127·74	4·34
5/Rrr	9·52	7·32	3,189	334·98	2,621·64	162·84	17·11	134·33	5·11
5/Y	27·16	22·55	17,787	654·89	3,841·73	873·07	32·15	177·79	4·91
5/Sss	24	17·13	9,671½	402·98	2,327·91	491·27	20·47	130·10	5·08
5/M	20·29	17·90	14,656	722·32	3,874·05	759·08	37·41	194·49	5·18
5/K	39·87	27·65	17,423¼	437·00	2,412·42	833·21	20·90	129·00	4·78
5/F	13	8·06	5,751½	442·42	3,575·37	270·78	20·83	156·10	4·71
5/Ttt	29·68	20·77	8,187½	275·86	2,459·46	433·50	14·61	134·27	5·20
5/Uuu	24	21·58	9,190	382·92	2,682·90	492·64	20·53	134·37	5·36
Means	22·82	16·43	9,088·63	398·20	3,118·69	457·24	20·03	153·13	5·03

Supplement to the " Journal of Agriculture," South Australia, June, 1937.]

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1937.

Herd No.	No. of Cows in Herd	No. of Cows in Milk.	Milk. Per Herd during January.	Milk. Per Cow during January.	Milk. Per Cow December to January.	Butterfat. Per Herd during January.	Butterfat. Per Cow during January.	Butterfat. Per Cow December to January.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B	20	18·71	8,909	445·45	1,035·23	507·55	25·38	52·22	5·70
6/C	29	25·84	20,402	703·55	1,558·82	868·43	29·94	64·13	4·26
6/Y	14	12	12,756½	911·18	1,793·71	521·94	37·28	73·59	4·09
6/Ff	31·71	23·52	26,212½	826·63	1,638·39	1,034·01	32·61	63·81	3·94
6/Ll	20·71	16·03	20,782	998·24	1,731·44	701·14	33·68	57·52	3·38
6/Pp	30·58	29·45	25,528½	834·81	1,625·15	1,186·66	38·81	75·79	4·65
6/Ss	18·58	13·74	19,274½	1,037·36	2,290·43	700·20	37·69	81·45	3·63
6/Tt	24·74	16·03	15,456	624·73	1,202·10	668·71	27·03	49·89	4·33
6/Vv	30·97	25·26	26,181½	845·38	1,714·52	1,081·89	34·93	72·10	4·13
6/Oo	21·90	18·29	16,330	746·07	1,550·81	665·26	30·38	62·81	4·07
6/Xx	29	24·45	26,259	905·48	1,845·01	1,010·42	34·84	70·64	3·85
6/Ccc	31·55	27·87	23,630½	748·98	1,705·56	1,003·36	31·80	69·58	4·25
6/Ddd	22·06	21·26	16,976	769·53	1,567·70	710·91	32·23	65·30	4·19
6/Mmm	9	7·52	8,051½	894·61	1,780·56	320·93	35·66	69·96	3·99
6/Ooo	31	26·48	28,636	923·74	1,819·70	1,214·39	39·17	74·90	4·24
6 Ppp	28	24·55	24,720½	882·87	1,841·58	1,052·91	37·60	75·67	4·26
6/Ttt	30·45	24·97	19,426½	637·98	1,337·88	873·32	28·68	57·81	4·50
6/Sss	41	30·16	28,047	684·07	1,414·27	1,058·05	25·81	54·00	3·77
6/Uuu	88·81	74·32	57,317	645·38	1,313·55	2,493·79	28·12	56·02	4·35
6/Xxx	31·97	29·19	31,787	994·27	2,036·65	1,244·33	38·92	80·84	3·91
6/Zzz	28	27·90	21,139	754·96	1,435·17	884·31	31·58	60·17	4·18
6/A4	20·87	18·68	17,954½	860·30	1,598·93	820·67	39·32	71·04	4·57
6/B4	26	26	24,025	924·04	—	950·64	36·56	—	3·96
6/Yyy	23	17	13,066½	568·11	—	583·74	25·38	—	4·47
Means	28·45	24·13	22,203·23	780·32	1,585·68	923·23	32·45	64·96	4·16

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1937.

Herd No	No of Cows in Herd.	No of Cows in Milk.	Milk. Per Herd during February.	Milk. Per Cow during February.	Milk. Per Cow December to February.	Butterfat. Per Herd during February.	Butterfat. Per Cow during February.	Butterfat. Per Cow December to February.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B	20	16·25	6,568	328·40	1,363·63	379·19	18·96	71·18	5·77
6/C	29	24·36	16,372	564·55	2,123·37	692·11	23·87	88·00	4·23
6/Y	13·86	11·86	11,338	818·04	2,611·75	465·07	33·55	107·14	4·10
6/Ff	33·61	25·18	22,916	681·82	2,320·21	879·87	26·18	89·99	3·84
6/Ll	20	16	16,128	806·40	2,537·84	565·48	28·27	85·79	3·51
6/Pp	30	27·82	21,764½	725·48	2,350·63	1,047·52	34·92	110·71	4·81
6/Ss	19·96	16·25	18,848	944·29	3,234·72	679·41	34·04	115·49	3·60
6/Tt	25·32	17·32	13,746	542·89	1,744·99	581·25	22·96	72·85	4·23
6/Vv	31·71	27·96	24,809	782·37	2,496·89	1,122·51	35·40	107·50	4·52
6/Oo	22·79	17·57	11,757	515·88	2,066·69	460·92	20·22	83·03	3·92
6/Xx	28·57	25·43	21,273	764·30	2,609·31	803·21	28·87	99·51	3·75
6/Ccc	32	27·89	22,082	690·06	2,395·62	882·00	27·56	97·14	3·99
6/Ddd	23	22·39	14,373	624·91	2,192·62	537·42	23·37	88·67	3·74
6/Mmm	9	6·43	6,519	724·33	2,504·89	255·42	28·38	98·34	3·92
6/Ooo	31	25·64	23,989	773·84	2,593·54	957·18	30·88	105·78	3·99
6/Ppp	27·39	23·82	17,229½	629·04	2,470·62	757·52	27·66	103·33	4·40
6/Ttt	32·93	27·14	18,897	573·78	1,911·66	858·79	26·08	83·89	4·55
6/Sss	41·11	31·96	27,326	676·62	2,090·89	1,086·53	26·91	80·91	3·98
6/Uuu	99·39	85	56,497½	568·44	1,881·99	2,472·30	24·87	80·89	4·38
6/Xxx	32·32	30·75	29,796	921·90	2,958·55	1,156·36	35·78	116·62	3·88
6/Zzz	28	27·04	17,762	634·36	2,069·53	759·28	27·12	87·29	4·27
6/A4	21·29	19·11	15,453	725·83	2,324·76	704·09	33·07	104·11	4·56
6/B4	27·11	26·64	21,876	806·93	1,730·97	879·43	32·44	69·00	4·02
6/Yyy	23	17·57	11,888	516·87	1,084·98	506·94	22·04	47·42	4·26
Means	29·27	24·89	19,550·31	668·04	2,247·57	812·08	27·75	92·50	4·15

Supplement to the "Journal of Agriculture," South Australia, June, 1937.]

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat.¹			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow December to March.	Per Herd during March.	Per Cow during March.	Per Cow December to March.	
			Lbs.	Lbs.	Lbs	Lbs.	Lbs.	Lbs.	%
6/B	20	10·32	3,960½	198·03	1,561·66	209·62	10 48	81·66	5·29
6/C	29	20·65	11,094½	382·57	2,505·94	529 76	18·27	106·27	4·77
6/Y	13	11	9,439½	726·11	3,337·86	408 19	31·40	138·54	4·32
6/Ff	35 32	26·35	23,426½	663·26	2,983·47	934·52	26·46	116·45	3·99
6/Ll	19·16	16·00	15,283	797·65	3,325·49	579·88	30·26	116·05	3·79
6/Pp	33 32	32·10	22,570	677·37	3,028·00	1,134·38	34·04	144·75	5·03
6/Ss	20	18·35	22,419	1,120·95	4,355 67	864·13	42·31	157·80	3·77
6/Tt	25·90	17·90	14,120½	545 19	2,290·18	614 56	23·73	96·58	4·35
6/Vv	34·55	32·19	30,887	893 98	3,390 87	1,394·50	40·36	147·86	4·51
6/Oo	24	18·61	14,338	597 42	2,664 11	615 33	25·64	108·67	4·29
6/Xx	28	24·03	21,454½	766·23	3,375·54	778·21	27·79	127·30	3·63
6/Ccc	33·42	30·42	25,993½	777·78	3,173·40	1,030·96	30·85	127·99	3·97
6/Ddd	22 71	21·13	13,335½	587 21	2,779·83	531·60	23·41	112·08	3·99
6/Mmm	9	7·87	8,553½	950·39	3,455·28	374·91	41·66	140·00	4·38
6/Ooo	30·71	24	22,692	738 91	3,332·45	960·92	31 29	137·07	4·23
6/Ppp	31·77	29·16	21,765	685·08	3,155·70	994·87	31·31	134·64	4·57
6/Ttt	34 94	27·61	21,859	625 61	2,537·27	957·98	27 42	111·31	4·38
6/Sss	42	34·90	32,890½	783 11	2,874·00	1,296·34	30·87	111·78	3·94
6/Uuu	104·16	90 52	60,962	585·26	2,467 25	2,609 96	25 06	105·95	4·28
6/Xxx	34·10	31 84	31,690	929 32	3,887·87	1,223 59	35·88	152·50	3·86
6/Zzz	27 10	26·32	17,646	651·14	2,720·67	793·06	29·26	116·55	4·49
6/A4	22	20 94	16,905	768 41	3,093·17	778 31	35·38	139 49	4·60
6/B4	28	26·87	19,029	679·61	2,410·58	831 01	29 68	98 68	4·37
6/Yyy	22 74	16·97	13,752	604·75	1,689·73	579·69	25·49	72·91	4 22
Means	30·20	25 67	20,669·42	684 32	2,927 94	875·35	28 98	121 36	4 23

HILLS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1937.

Herd No.	No. of Cows in Herd.	No of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during January.	Per Cow during January.	Per Cow July to January.	Per Herd during January.	Per Cow during January.	Per Cow July to January.	
			Lbs.	Lbs.	Lbs	Lbs.	Lbs	Lbs.	%
7/P	30·13	24·06	13,801½	458·06	4,261 72	680·54	22·59	201 64	4·93
7/Eee	18	16·55	8,719	484·39	4,937 11	474 52	26·36	248 83	5·44
7/Ggg	21	19·26	8,612	410·09	3,682 20	420 56	20·03	172·82	4 88
7/Hhh	15	13	7,781	518·73	4,620·90	280·71	18 71	161 17	3·61
7/Iii	21	17·45	9,501½	452·45	4,848·10	333·81	15·90	170·22	3·51
7/Kkk	24·55	23·19	15,005	611·20	4,839 47	688·96	28·06	230·26	4·59
7/Mmm	15	13·58	6,341½	422·77	3,339 13	376·26	25·08	184·62	5·93
7/Nnn	16·32	13·94	10,254	628·31	4,512·10	440·18	26 97	187·37	4·29
7/Ooo	28 55	24·45	18,530½	649·05	3,833·84	737·53	25 83	156·23	3·98
7/Qqq	22·52	21·52	11,347	503·86	4,454·54	542·33	24 08	208·25	4·78
7/Rrr	19	18·03	8,517	448 26	4,254·87	440·92	23·21	218·24	5·18
7/Sss	13	11·97	8,391	645·46	5,562·05	322·56	24·81	207·57	3·84
7/Ttt	6·81	4·68	4,708½	691·40	4,530·80	202 83	29·78	189·36	4·31
7/Uuu	18	15	10,604	588·73	3,691·45	471 58	26·18	158·28	4·45
7/Vvv	20	17·58	9,407½	470·38	3,672·99	437·81	21·89	171·04	4·65
7/Www	19	16	11,036	580·84	4,684·78	455·25	23·96	193·47	4·13
7/Xxx	26	23·39	14,452	551·18	4,654·59	512·99	19·60	166·66	3·55
7/Yyy	12	11	5,409½	450·79	4,529·15	282·81	23·57	226·43	5·23
7/Zzz	14	14	7,688	549·14	5,746·06	293·77	20·98	217·92	3·82
7/A4	17	16·32	8,708½	513·89	4,157·48	367·67	21·68	177·42	4·27
7/B4	11·06	10·81	6,668½	602·93	5,274·12	342·31	30·95	253·60	5·13
Means	18·47	16·47	9,784·93	529·68	4,379·95	433·61	23·47	191·98	4·43

HILLS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow July to February.	Per Herd during February.	Per Cow during February.	Per Cow July to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/P	29·89	22·43	12,238	409·43	4,671·15	602·68	20·16	221·80	4·92
7/Eee	18	13·96	6,856	380·89	5,318·00	381·55	21·20	270·03	5·57
7/Ggg	21	18·07	7,171	341·47	4,023·67	344·29	16·39	189·21	4·80
7/Hhh	15	13	6,426	428·40	5,049·30	237·18	15·81	176·98	3·69
7/Iii	21	15	4,866½	231·74	5,079·84	215·02	10·24	180·46	4·84
7/Kkk	24	21·46	11,587	482·79	5,322·26	557·63	23·23	253·49	4·81
7/Mmm	15·89	12·82	6,598½	415·26	3,754·39	395·96	24·92	209·54	6·00
7/Nnn	16	13·14	8,934	558·37	5,070·47	370·72	23·17	210·54	4·15
7/Ooo	29	22·61	15,498½	534·43	4,368·27	657·17	22·66	178·89	4·24
7/Qqq	24·29	22 36	10,850½	446 71	4,901·25	520·84	21·44	229·69	4·80
7/Rrr	19	16·07	6,798	357·79	4,612·66	325·36	17·12	235·36	4·79
7/Sss	13	11·25	7,233½	556·42	6,118·47	280·53	21·58	229·15	3·89
7/Ttt	6	4	3,290	548·33	5,079·13	131·72	21·95	211·31	4·00
7/Uuu	18·43	13·64	6,926½	375·82	4,067·27	302·82	16·43	174·71	4·37
7/Vvv	19·89	16·25	8,213½	412·95	4,085·94	406·34	20·43	191·47	4·95
7/Www	19	16	9,716	511·37	5,196·15	433·62	22·82	216·29	4·46
7/Xxx	26	23·61	12,295½	472·90	5,127·49	487·19	18·74	185·40	3·96
7/Yyy	12	10·36	3,890	324·21	4,853·36	208·15	17·35	243·78	5·35
7/Zzz	14	13·50	7,014	501·00	6,247·06	278·35	19·88	237·80	3·97
7/A4	17·54	17·36	7,994	455·75	4,613·23	324·59	18·51	195·93	4·06
7/B4	12·29	10·29	5,234	425·87	5,699·99	260·95	21·23	274·83	4·99
Means	18·63	15·58	8,077·67	433·60	4,832·75	367·75	19·74	212·49	4·55

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow July to March.	Per Herd during March	Per Cow during March.	Per Cow July to March.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/P	29·06	20·35	12,458	428·70	5,099·85	617·52	21·25	243·05	4·96
7/Eee	18	12·23	5,150	286·11	5,604·11	283·38	15·74	285·77	5·50
7/Ggg	21	16·68	5,097	242 71	4,266·38	256·42	12·21	201·42	5·03
7/Hhh	15	14	7,781	518·73	5,568·03	285·23	19·02	196·00	3·67
7/Iii	21	12·39	5,445	259·28	5,339·12	209·14	9·96	190·42	3·84
7/Kkk	24·71	22·06	10,323½	417·78	5,740·04	481·94	19·50	272·99	4·67
7/Mmm	16	12·58	5,126½	320·41	4,074·80	281·26	17·58	227·12	5·49
7/Nnn	16	14·32	11,039½	689·96	5,760·43	457·49	28·59	239·13	4·14
7/Ooo	29	22·68	13,447½	463·71	4,831·98	572·98	19·76	198·65	4·26
7/Qqq	25	19·94	8,605½	344·22	5,245·47	414·80	16·59	246·28	4·82
7/Rrr	18·71	14·61	5,074	271·19	4,883·85	250·68	13·40	248·76	4·94
7/Sss	12·45	7·94	5,627	451·96	6,570·43	223·37	17·94	247·09	3·97
7/Ttt	6	4·06	3,286	547·66	5,626·79	121·98	20·33	231·64	3·71
7/Uuu	19·81	14·26	8,552½	431·72	4,498·99	379·78	19·17	193·88	4·44
7/Vvv	19	15·06	7,424	390·73	4,476·67	350·04	18·42	209·89	4·71
7/Www	19	17·19	9,125	480·26	5,676·41	401·64	21·14	237·43	4·40
7/Xxx	22·74	21·87	10,834	476·43	5,603·92	399·04	17·55	202·95	3·68
7/Yyy	12	8·19	3,674	306·16	5,159·52	174·84	14·57	258·35	4·76
7/Zzz	14	12·23	5,785½	413·25	6,660·31	232·56	16·61	254·41	4·02
7/A4	18·90	17·23	8,002	423·39	5,086·62	319·11	16·88	212·81	3·99
7/B4	11·71	9·32	5,142	439·11	6,139·10	275·19	23·59	298·33	5·35
Means	18·53	14·72	7,476·17	403·50	5,255·17	332·78	17·96	231·26	4·45

Supplement to the Journal of Agriculture, South Australia, June, 1937.]

MOUNT BARKER DISTRICT HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during January.	Per Cow during January.	Per Cow Nov. to January.	Per Herd during January.	Per Cow during January.	Per Cow Nov. to January.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
10/A	27	20·58	9,763½	361·61	1,431·63	436·33	16·15	64·18	4·49
10/B	45	33·13	13,178	292·84	1,386·83	529·76	11·77	58·89	4·02
10/C	52·13	46·19	25,775	494·44	1,786·47	1,310·63	25·14	92·78	5·09
10/D	13	11·19	4,996	384·31	1,176·19	250·72	19·29	58·70	5·02
10/E	14	12·61	7,980½	570·03	1,991·49	334·27	23·88	90·07	4·19
10/F	16·61	14·48	6,750½	406·41	1,238·19	309·42	18·63	55·46	4·61
10/G	15	12·23	5,854½	390·30	1,557·80	258·96	17·26	72·40	4·42
10/H	16	13·61	6,320	395·00	1,242·81	313·74	19·61	64·06	4·96
10/I	22·06	20·32	16,908½	766·47	2,818·76	644·73	29·23	103·39	3·81
10/J	13	11·74	8,575½	659·65	2,494·68	340·00	26·15	93·65	3·96
10/K	28	26·39	15,400	550·00	1,911·64	651·87	23·28	80·62	4·23
10/L	28	24·52	12,760½	431·82	1,609·91	642·86	22·94	82·12	5·05
10/N	18	16·61	6,306½	350·36	1,401·63	319·43	17·75	69·53	5·07
10/O	28·55	26·58	13,583½	475·78	1,636·49	693·81	24·30	82·06	5·11
10/P	39·13	31·61	18,108	462·76	1,496·08	369·67	22·23	74·02	4·80
10/Q	17	14·61	9,526	560·35	2,027·28	393·28	23·13	83·68	4·13
10/R	18·42	16·42	7,693½	417·67	1,479·08	372·05	20·20	76·72	4·84
10/S	31	27·55	16,076	518·58	2,234·09	645·00	20·81	88·88	4·01
10/T	22	19·48	9,043	411·04	1,459·17	462·03	21·00	77·51	5·11
10/U	19	18	10,509	553·11	2,207·40	408·30	21·49	88·07	3·89
Means	24·15	20·89	11,255·40	466·16	1,732·52	509·35	21·10	78·61	4·53

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow Nov. to February.	Per Herd during February.	Per Cow during February.	Per Cow Nov. to February.	
			Lbs.	Lbs.	Lbs.	Lbs	Lbs.	Lbs.	%
10/A	25	18·29	6,506½	260·26	1,691·89	297 50	11·90	76 08	4·57
10/B	45	32·43	11,276½	250·59	1,637·42	461·84	10·26	69·15	4·10
10/C	50·11	45·43	20,131	401·73	2,188·20	974·05	19·44	112·22	4·84
10/D	13	9·25	4,125	317·31	1,493·50	214·36	16·49	75·19	5·20
10/E	14	13·93	8,070	576·43	2,567·92	334·69	23·91	113·98	4·15
10/F	16	12·07	4,892	305·75	1,543·94	232·58	14·54	70·00	4·75
10/G	15	11·86	4,928	328·53	1,886·33	223·47	14·90	87·30	4·53
10/H	16	14·25	5,733	358·37	1,601·18	284·46	17·78	81·84	4·96
10/I	23·71	21·36	16,621	701·01	3,519·77	590·45	24·90	128·29	3·55
10/J	12	11·54	7,499	624·91	3,119·59	265·31	22·11	115·76	3·54
10/K	27·57	27·07	14,050½	509·63	2,421·27	580·46	21·05	101·67	4·13
10/L	28·82	27·07	12,345	428·35	2,038·26	605·96	21·03	103·15	4·91
10/N	18	16·18	6,616½	367·58	1,769·21	351·02	19·50	89·03	5·31
10/O	28	26·54	13,316½	475·59	2,112·08	643·94	23·00	105·06	4·84
10/P	39	30·82	12,577	322·49	1,818·57	611·69	15·68	89·70	4·86
10/Q	17·82	14·24	8,406	471·71	2,498·99	356·65	20·01	103·69	4·24
10/R	17·71	15	6,650	375·49	1,854·57	341·84	19·30	96·02	5·14
10/S	31	25·21	11,841	381·97	2,616·06	503·49	16·24	105·12	4·25
10/T	22	18·07	8,022	364·63	1,823·80	407·60	18·53	96·04	5·08
10/U	19	18	8,610	453·16	2,760·56	344·90	18·15	106·22	4·01
Means	23·94	20·43	9,610·83	401·51	2,139·81	431·31	18·02	96·90	4·48

Supplement to the Journal of Agriculture, South Australia, June, 1937.]

MOUNT BARKER HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow Nov. to March.	Per Herd during March.	Per Cow during March.	Per Cow Nov. to March.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
10/A	25·10	16·55	6,989	278·44	1,970·33	309·48	12·33	88·41	4·43
10/B	45	25·71	8,712	193·60	1,831·02	385·03	8·56	77·71	4·42
10/C	51	46·71	17,858	350·16	2,538·36	938·29	18·40	130·62	5·25
10/D	13	10·77	5,054	388·76	1,882·26	245·96	18·92	94·11	4·87
10/E	15·13	11 77	7,779	514·14	3,082·06	324·54	21·49	135·47	4·17
10/F	16	12	4,944½	309·03	1,852·97	249·93	15·62	85·62	5·05
10/G	15	12·32	4,979½	331·96	2,218·29	240·56	16·04	103·34	4·83
10/H	16·65	13·23	4,775½	286·81	1,887 99	234·34	14·07	95·91	4·91
10/I	24	22	13,206	550·25	4,070·02	520·37	21·68	149·97	3·94
10/J	12	11	8,044½	670·37	3,789·96	281·84	23·49	139·25	3·50
10/K	27	22·84	12,135½	449·46	2,870·73	509·58	18·87	120·54	4·20
10/L	29·61	27·16	12,533	423·27	2,461·53	654·32	22·10	125·25	5·22
10/N	18	16·16	4,639½	257·75	2,026·96	257·70	14·32	103·35	5·55
10/O	28	28	10,896½	389·16	2,501·24	572·92	20·46	125·52	5·26
10/P	37·52	27·23	13,258½	353·37	2,171·94	681·59	18·17	107·87	5·14
10/Q	19·77	15·61	8,458	427 81	2,926·80	376·99	19·07	122·76	4·46
10/R	17	13·97	5,743½	337·85	2,192·42	308·05	18·12	114·14	5·36
10/S	30·10	23 42	10,617	352·72	2,968·78	432·48	14·37	119·49	4·07
10/T	22	18·97	7,583½	344·70	2,168·50	395·36	17·97	114·01	5·21
10/U	19	17·84	9,549½	502·61	3,263·17	341·17	17·96	124·18	3·57
Means	24·04	19·66	8,887 83	369·65	2,513·26	413·03	17·18	114·24	4·65

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during January.	Per Cow during January.	Per Cow March to January.	Per Herd during January.	Per Cow during January.	Per Cow March to January.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A	33·13	22 06	14,878	449·08	4,029·34	727·68	21·96	218·41	4·89
9/C	16	10·65	5,339	333·69	5,534·83	261·78	16·36	249·34	4·90
9/D	24	12·84	9,631	401·29	4,053·93	496·15	20·67	221·36	5·15
9/E	18	15	10,509	583·83	5,489·91	508·42	28·25	277·20	4·84
9/F	18	15·19	6,600	366·67	5,543·39	322·24	17·90	243·26	4·88
9/I	26·55	22·10	8,124	305·92	4,617·92	371·63	14·00	199·92	4·61
9/L	32·42	19·03	6,312½	194·71	3,834·10	273·60	8·44	159·51	4·33
9/O	35	29 35	14,902½	425·79	5,556·02	571·37	16·32	239·05	3·83
9/P	45	24·29	5,358	119 07	4,604·25	268·32	5·96	225·71	5·01
9/W	30	24·32	15,150	505·00	6,896 29	703·01	23·43	320·16	4·64
9/X	14	13	4,200½	300·03	4,538·60	228·10	16·29	228·61	5·43
9/Y	10	8	4,867	486·70	5,486·58	188·57	18·86	219·47	3·87
9/Z	11	9·52	4,031	366·45	3,893·89	231·99	21·09	206·21	5·76
9/Aa	8	8	4,634½	579·31	5,499·22	291·93	36·49	284·98	6·30
9/Bb	36·42	33·32	21,852½	600·01	5,382·56	1,009·15	27·71	267·88	4·62
9/Ee	53·35	41·87	14,332	268·64	3,644·52	734·84	13·77	177·59	5·13
9/Gg	10	8·06	4,515½	451·55	5,717·04	258·89	25·89	319·45	5·73
9/Hh	11·77	7·55	2,378	202·04	3,510·00	119·05	10·11	181·25	5·01
9/Ii	29	28	13,516	466·07	4,487·14	741·71	25·58	230·93	5·49
9/Jj	19	16·45	9,521	501·11	5,718·38	442·89	23·31	269·09	4·65
9/Kk	14	10·45	5,681½	405·82	8,635·18	256·20	18·30	159·72	4·51
9/Ll	13	13	8,354½	642·65	8,449·54	325·04	25·00	345·39	3·89
9/G	38·65	37·74	26,106½	675·46	2,649·43	1,251·43	32·38	123·65	4·79
Means	23·75	18·69	9,599·77	404·17	4,878·16	460·17	19·37	232·15	4·79

Supplement to the Journal of Agriculture, South Australia, June, 1937.]

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow March to February.	Per Herd during February.	Per Cow during February.	Per Cow March to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A	28·50	18·64	11,693	410·28	4,439·62	582·28	20·43	238·84	4·98
9/C	16	9·89	5,194	324·62	5,859·45	256·02	16·00	265·34	4·93
9/D	23·68	15·86	11,913½	502·42	4,556·35	637·18	26·88	248·24	5·41
9/E	15·43	12·75	7,252	469·99	5,959·90	360·09	23·34	300·54	4·97
9/F	17·36	14·18	5,214	300·34	5,843·73	244·61	14·09	257·35	4·69
9/I	26·46	18·29	6,687	252·72	4,870·64	282·46	10·30	210·22	4·07
9/L	33	17·30	5,815½	176·35	4,010·45	249·27	7·56	167·07	4·32
9/O	35	28·79	11,746	335·60	5,891·62	475·05	13·57	252·62	4·04
9/P	45	15·89	4,367	97·04	4,701·29	234·42	5·21	230·92	5·37
9/W	30·11	25·57	15,956½	529·94	7,426·23	714·78	23·74	343·90	4·48
9/X	14·29	9·36	2,439	170·67	4,709·27	134·36	9·40	238·01	5·51
9/Y	9·68	7·68	4,154	429·76	5,916·34	165·18	17·09	236·56	3·96
9/Z	11	9·71	3,404	309·45	4,203·34	183·22	16·66	222·87	5·38
9/AA	8	7·46	3,170½	396·31	5,895·53	166·10	20·76	305·74	5·24
9/BB	35·29	32·29	22,770	645·22	6,027·78	1,049·30	29·73	297·61	4·61
9/EE	52·32	36·11	13,025½	248·96	3,893·48	622·50	11·91	189·50	4·83
9/GG	10	7·50	4,288	428·80	6,145·84	218·36	21·84	341·29	5·09
9/HH	11	3·82	1,158½	105·31	3,615·31	60·22	5·47	186·72	5·20
9/II	27·39	24·96	6,375	232·75	4,719·89	342·73	12·51	243·44	5·38
9/JJ	19	16·89	8,624½	453·92	6,172·30	389·45	20·50	289·59	4·52
9/KK	Withdra	wn							
9/LL	13	13	7,266	558·92	9,008·46	300·75	23·13	368·52	4·14
9/G	40	40	20,678	516·95	3,166·38	958·18	23·95	147·60	4·63
Means	23·71	17·55	8,326·89	351·27	5,227·31	392·11	16·54	248·69	4·71

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1937.

Herd No.	No. of Cows in Herd.	No. of Cows in Milk.	Milk.		Butterfat.		Average Test.
			Per Herd during March.	Per Cow during March.	Per Herd during March.	Per Cow during March	
			Lbs.	Lbs.	Lbs.	Lbs.	%
9/A	24	15·29	10,178	424·08	508·99	21·21	5·00
9/D	20·61	17·23	12,894½	625·64	707·23	34·31	5·48
9/E	10	9·87	5,934½	593·45	311·67	31·17	5·25
9/I	24·52	17·03	6,994	285·23	298·22	12·16	4·26
9/P	45	12·61	3,490	77·56	194·39	4·32	5·57
9/W	30·84	25·77	15,178	492·15	685·01	22·21	4·51
9/X	15	8	2,511	167·40	124·27	8·28	4·95
9/Y	8·68	7·42	3,882½	447·29	158·36	18·24	4·08
9/Z	10·26	8·45	2,209	215·30	122·58	11·94	5·55
9/AA	8	7	2,759	344·87	155·81	19·48	5·65
9/BB	34·03	31·74	22,760	669·08	1,061·03	31·18	4·66
9/EE	34	17·10	5,096½	149·90	269·59	7·93	5·29
9/GG	10	8·39	4,879½	487·95	280·12	28·01	5·74
9/HH	11	2·48	644	58·55	31·38	2·85	4·87
9/II	21	16·03	4,794	228·28	249·78	11·89	5·21
9/LL	13	10·94	4,049	311·46	177·56	13·66	4·39
9/G	40	40	16,988	424·70	877·00	21·93	5·16
9/MM	13	11·13	6,637	510·54	292·60	22·51	4·41
9/NN	10	0·61	497	49·70	22·70	2·27	4·57
9/OO	19	16	7,440	391·58	374·23	19·70	5·03
9/PP	14	14	8,137½	581·25	363·53	25·97	4·47
9/QQ	21	21	6,959½	331·40	414·15	19·72	5·95
Means	19·86	14·46	7,041·89	354·56	349·10	17·58	4·95

Statement Showing Production by the Southern Districts Herd Testing Association for twelve months ended 28th February, 1937

Month.	No. of Herds.	Average Cows Registered.		Average Cows in Milk.		Milk Produced.			Average Test.	Butterfat Produced.		
		In Association.	Per Herd.	In Association.	Per Herd.	By Association.	Per Herd.	Per Cow.		By Association.	Per Herd.	Per Cow.
						Lbs.	Lbs.	Lbs.	%	Lbs.	Lbs.	Lbs.
March......	22	486·54	22·12	313·17	14·24	139,722½	6,351·02	287·18	4·90	6,843·71	311·08	14·07
April.....	22	491·06	22·32	316·85	14·40	127,279½	5,785·43	259·19	5·03	6,402·62	291·03	13·04
May	22	503·99	22·91	350·97	15·95	170,954½	7,770·66	339·20	4·87	8,332·60	378·75	16·53
June	22	505·03	22·96	353·03	16·05	182,634½	8,301·57	361·63	4·92	8,976·76	408·03	17·77
July	22	503·38	22·88	372·68	16·94	217,112½	9,868·75	431·31	4·83	10,503·92	477·45	20·87
August	22	508·07	23·09	390·17	17·74	260,853½	11,856·98	513·42	4·61	12,021·50	546·43	23·66
September .	22	520·04	23·64	414·38	18·84	291,103½	13,231·98	559·77	4·67	13,602·31	618·29	26·16
October	23	554·27	24·10	451·60	19·63	347,750	15,119·57	627·40	4·63	16,092·11	699·74	29·04
November ..	23	560·69	24·38	475·73	20·68	314,971½	13,694·41	561·76	4·76	14,990·55	651·76	26·74
December ..	23	553·91	24·08	477·67	20·77	268,269	11,663·87	484·32	4·72	12,649·77	549·99	22·84
January ...	23	546·29	23·75	429·79	18·69	220,794½	9,599·77	404·17	4·79	10,583·99	460·17	19·37
February ..	22	521·51	23·71	386·03	17·55	183,191½	8,326·89	351·27	4·71	8,626·51	392·11	16·54
Means......	268 22·33	6,254·78 521·23	23·34	4,732·07 394·34	17·66	2,724,637	12,201·68	5,227·31	4·76	129,626·35	580·50	248·69

Results of Individual Herds in the Southern Districts Herd Testing Association for twelve months ended 28th February, 1937

Herd No.	Period Under Test.	Mean Cows in Herd.	Mean Cows in Milk.	Milk Produced.		Mean Butterfat Test.	Butterfat Produced.	
				Total.	Per Cow.		Total.	Per Cow.
	Months.			Lbs.	Lbs.	%	Lbs.	Lbs.
9/LL	12	12·73	10·03	114,706	9,008·46	4·09	4,689·70	368·52
9/W	12	29·33	24·02	217,563½	7,426·23	4·64	10,085·60	343·90
9/E	12	15·07	12·05	89,823	5,959·90	5·04	4,530·11	300·54
9/BB	12	33·95	28·26	205,375	6,027·78	4·92	10,103·30	297·61
9/JJ	12	18·37	15·78	113,395½	6,172·30	4·69	5,319·88	289·59
9/C	12	16·00	12·55	93,751½	5,859·45	4·53	4,245·40	265·34
9/F	12	17·93	14·07	104,883½	5,848·78	4·40	4,615·28	257·35
9/O	12	30·86	23·93	183,105½	5,891·62	4·26	7,796·82	252·62
9/D	12	28·20	16·26	128,280	4,556·35	5·46	6,999·69	248·24
9/II	12	33·33	27·42	157,699	4,719·89	5·14	8,112·96	243·44
9/A	12	30·58	19·79	136,066½	4,439·62	5·37	7,303·38	238·84
9/X	12	13·59	11·09	63,719½	4,709·27	5·08	3,234·91	238·01
9/Y	12	10·80	8·18	63,743½	5,916·34	4·01	2,555·75	236·56
9/P	12	39·43	31·15	187,417½	4,701·29	4·86	9,104·96	230·92
9/Z	12	12·71	9·43	53,592	4,203·34	5·29	2,832·99	222·87
9/I	12	26·83	20·94	130,477	4,870·64	4·32	5,641·97	210·22
9/EE	12	54·74	41·67	213,356	3,893·48	4·86	10,372·93	189·50
9/HH	12	13·17	10·05	47,690	3,615·31	5·16	2,461·42	186·72
9/L	12	31·72	18·68	127,310	4,010·45	4·16	5,300·90	167·07
9/GG	12	9·82	8·07	60,415½	6,145·84	5·55	3,352·60	341·29
9/AA	12	9·76	6·67	57,857	5,895·58	5·16	2,983·49	305·74
9/KK	11	15·56	12·28	56,598	3,635·18	4·39	2,485·69	159·72
9/G	5	37·24	31·17	117,812	3,166·38	4·67	5,496·67	147·60
	268	23·34	17·66	2,724,637	5,227·31	4·76	129,626·35	248·69

FRANK TRIGG, Government Printer, North Terrace, Adelaide.

Harvesting one of the Winning Competition Crops.

Limestone becomes more common towards the west until clay subsoils are partly replaced by limestone with a considerable amount also in places on the surface.

Although much of the land is not of high quality, under good methods of agricultural and livestock management it can be made to produce well and to retain its productivity.

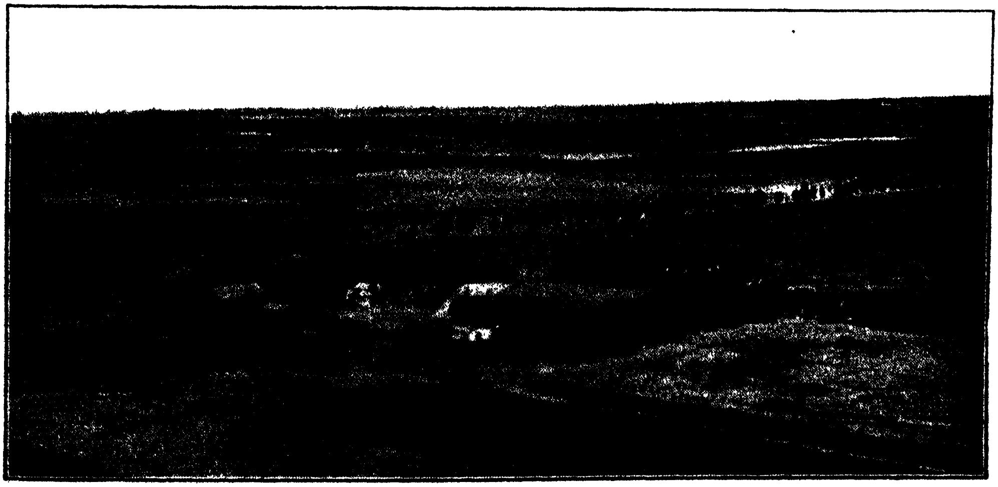
Towards the west of the area there are many long, gradual slopes with a shallow, light-coloured sandy surface soil over a very retentive clay. These have grown some wonderful crops during recent years, but have the reputation of being cold and unthrifty in wet winters. It is so long since such winters occurred that to many people, including the writer, this remains to be proved.

On the eastern side of the area there is no surface limestone and only occasional deposits of soft rubble underground.

RAINFALL.

Average rainfall shows a considerable variation throughout this area, increasing from the east to the west. This is shown by the district averages from recording stations in the east, centre and west, which are:—Pinnaroo: recorded for 30 years, 14.19in. per annum; Lameroo: recorded for 37 years, 15.79in. per annum; Geranium: recorded for 28 years, 16.39in. per annum.

Thus the western side of the district has 2.20in. greater average annual rainfall than the eastern side.



Aerial view of a farm in the Chandos district.

During the years of this crop competition the difference has been even greater. Rainfall records at Pinnaroo, Lameroo and Geranium for the years 1924 to 1936 are as follows:—

Chandos Crop Competition—Rainfall.

Year.	Pinnaroo.	Lameroo.	Geranium.
	ins.	ins.	ins.
1924	16·82	20·30	18·33
1925	13·18	17·28	17·19
1926	12·87	15·77	15·47
1927	7·86	10·40	12·37
1928	12·54	13·42	15·12
1929	9·14	17·95	15·72
1930	12·87	15·39	15·15
1931	12·44	13·64	15·76
1932	15·36	16·49	19·37
1933	10·94	11·85	15·92
1934	12·48	12·59	12·56
1935	9·43	13·00	17·34
1936	12·62	15·74	14·35
Average for 13 years of competition	12·19	14·91	15·74
General average .	14·19	15·79	16·39
Decline from average during years of competiton	2·00	0·88	0·65

It will be noted that for this period the Pinnaroo rainfall has been 2.72in. below that of Lameroo and 3.55in. below that of Geranium. During these years Pinnaroo rainfall has been 2in. below average; Lameroo, .88in.; and Geranium, only .65in.

It may be noted that only during two of these years, 1924 and 1932, did Pinnaroo rainfall exceed its average, while Lameroo exceeded the average in 1924, 1925, 1929, and 1932, also in 1926, 1930, and 1936 was very near it. Geranium received above average rainfall in 1924, 1925, 1931, 1932, 1933, and 1935, while in only two years, 1927 and 1934, was the rainfall much below normal.

Pinnaroo farmers must be given all credit for doing so well under adverse circumstances and there should be a very productive period in the near future for them.

Distribution of District Prize-winning Crops.

The analyses of winning crops show that the first prize has been awarded as follows:—Lameroo, five times; Parrakie, three times; Pinnaroo and Jabuk, each twice; Geranium, once.

If the leading three crops be taken, the distribution of awards is as follows:—Lameroo, 13; Pinnaroo, 8; Parrakie, 9; Jabuk, 4; Geranium, 3; Parilla, 2.

As would be expected, during very low rainfall years the awards are likely to go to the western side of the district, in average years to the centre of it, and in good years to the eastern side.

In order to recover as quickly as possible from recent bad times maximum efficiency will be necessary in all farming methods and the Chandos District Wheat Crop Competition is likely to help in this respect even more in the future than it has done in the past.

Wheat Varieties.

The rapid change in popularity of wheat varieties is one of the striking features of this competition. It shows, at least, that farmers are continually looking for varieties which are more productive and also those which show better characteristics, such as resistance to disease, more vigour in the early stages of growth, strength of straw, and good harvesting qualities. No wheat variety has ever been perfect, or probably ever will be, and so the search for better types is continuous, the plant breeders working to produce more suitable varieties and the farmers accepting such of them as appear useful in a particular environment.

It would appear that the testing of varieties is, to some extent, necessary for each individual farmer, as so often men in the same locality differ very greatly in their opinion of a wheat. This must be due to the varying individual farm methods either suiting a particular variety or otherwise. While this is so, there can be no doubt that the best possible test of suitability of any wheat is its popularity in a big crop competition, where it is showing among the best crops of the best farmers.

The change in a few years is illustrated here by the fact that of the six varieties most popular in the Chandos competition in 1924 there was not one entry in 1936.

There has been a total number of 62 varieties entered during the period of the competition. Many of these may be treated as casual, being proved not suited to soil and climatic conditions. In fact, of the 62, only a few have been really important, as 56 per cent. of the total entries are included in the leading five varieties and 77 per cent. in the leading 10.

In the following records the popularity of the chief varieties has been illustrated by the table showing number of entries each year, also by chart of the comparative popularity each year, and by graph of those most important, showing very distinctly how, as some varieties lost popularity, others took their place.

Varieties entered have been as follows:—

WHEAT VARIETIES—CHANDOS CROP COMPETITION, 1924-36.

NUMBER OF ENTRIES.

Variety.	1924.	1925.	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	Total.
Currawa	12	7	11	23	42	14	4	4	1	1	—	2	—	121 } 169
Joffre...........	1	1	—	7	14	17	7	—	1	—	—	—	—	48
Gluyas	18	14	17	17	19	7	4	3	2	—	—	—	—	101 } 119
Late Gluyas	3	2	—	4	5	3	—	—	1	—	—	—	—	18
Ranee (and Ranee 4H)	—	1	3	7	13	11	5	17	11	6	9	19	9	111
Gallipoli (and Free Gallipoli)	—	2	—	2	7	6	9	22	18	18	13	3	—	100
Sultan	—	3	10	11	22	17	15	3	4	1	1	—	1	88
Ford	15	18	23	8	6	1	—	—	—	—	—	—	—	71
Nabawa	—	—	1	2	4	8	12	7	8	2	1	1	—	46
Waratah	—	—	—	—	3	2	3	2	2	4	7	11	4	38
Sword	—	—	—	—	—	—	—	—	—	1	5	17	10	33
Caliph	2	2	4	2	2	6	2	2	4	1	—	—	—	27
Walker's Wonder	1	—	1	4	7	1	1	—	1	—	—	1	1	18
Sepoy	—	—	—	—	—	1	7	5	2	1	—	—	—	16
Kerley's Early ..	6	—	3	4	1	—	—	—	—	—	—	—	—	14
Faun	2	4	4	1	1	1	—	—	—	—	—	—	—	13
Ghurka	—	—	—	—	—	—	—	—	—	1	4	4	3	12
Yandilla King ...	5	1	--	—	4	—	—	1	—	—	—	—	—	11
Bobin	—	—	—	—	—	—	—	—	—	2	4	4	1	11
Queen Fan	5	1	—	1	3	—	—	—	—	—	—	—	—	10
Major	3	—	1	—	3	—	—	1	—	—	1	1	—	10
Nugget	—	—	—	—	1	1	4	3	1	—	—	—	—	10
Canberra	1	2	2	2	—	2	—	—	—	—	—	—	—	9
Daphne	4	1	1	—	1	—	—	—	—	—	—	—	—	7
Rajah	—	—	—	—	1	—	—	1	1	1	1	2	—	7
Graham.........	—	—	—	1	3	1	—	1	—	—	—	—	—	6
Penny	—	—	—	—	2	2	1	1	—	—	—	—	—	6
Dan	2	—	—	—	1	—	—	1	1	—	—	—	—	5
Federation	1	—	1	1	1	1	—	—	—	—	—	—	—	5
Felix	—	—	—	—	1	—	1	—	1	1	1	—	—	5

Wheat Varieties, Chandos Crop Competition, 1924-1936—*continued.*

Four entries each of King's Surprise, Huff's Imperial, Begum.

Three entries each of Baroota Wonder, Yardea, King's Early, Silver Bart, Baringa.

Two entries each of Early Bart, Turvey, Kerley's Wonder, Hard Federation, German Wonder, Nawab, Union, Derf, Bencubbin, Gluclub.

One entry each of Dollar, J7, King's White, Minister, Golden Return, Western Wonder, Indian R., Golden Drop, Onas, Austan, Field Marshal, Sovereign, Quality, Gluford, Nizam, Bena.

Total number of entries, 62.

Fifty-six per cent. of total in leading five varieties, Currawa to Sultan.

Seventy-seven per cent. of total in leading 10 varieties, Currawa to Caliph.

It will be noted that in the totals Currawa and Joffre have been bracketed together. This is because, although supposedly separate varieties with different breedings, they behave, under Murray Mallee conditions at least, entirely as one variety, and it is quite impossible to separate them, either by appearance of grain, behaviour of plants during growing period, appearance of plant during growth and at maturity, or peculiarities of crop when harvesting. In the succeeding chart and graph, therefore, they have been combined under the name of Currawa.

Similarly Gluyas and Late Gluyas are bracketed, as Late Gluyas was a selection from the original type, and in the Murray Mallee, where it never became popular, did not show sufficient differences to be kept separate. In chart and graph both are combined under the name of Gluyas.

Ranee and Ranee 4H are counted together, the later selection, certainly superior to the early ones, gradually displacing them until now all Ranee grown is of the 4H selection. The same applies to Gallipoli and Free Gallipoli. The names Ranee and Gallipoli in chart and graph include all selections.

The most popular varieties each year of the competition have been as follows:—

CHANDOS CROP COMPETITION.

MOST POPULAR WHEAT VARIETIES EACH YEAR.

Year.	Varieties (and Number of Entries of Each).					
	1	2	3	4	5	6
1924 ..	Gluyas 21	Ford 15	Currawa 13	Kerley's Early 6	Yandilla King 5	Queen Fan 5
1925 ..	Ford 18	Gluyas 16	Currawa 8	Faun 4	Sultan 3	King's Surprise 3
1926 ..	Ford 23	Gluyas 17	Currawa 11	Sultan 10	Faun 4	Caliph 4
1927 ..	Currawa 30	Gluyas 21	Sultan 11	Ford 8	Ranee 7	Walker's Wonder 4
1928 ..	Currawa 56	Gluyas 24	Sultan 22	Ranee 13	Gallipoli 7	Walker's Wonder 7
1929 ..	Currawa 31	Sultan 17	Ranee 11	Gluyas 10	Nabawa 8	Caliph Gallipoli 6
1930 ..	Sultan 15	Nabawa 12	Currawa 11	Gallipoli 9	Sepoy 7	Ranee 5
1931 ..	Gallipoli 22	Ranee 17	Nabawa 7	Sepoy 5	Currawa 4	Gluyas 4
1932 ..	Gallipoli 18	Ranee 11	Nabawa 8	Sultan 4	Caliph 4	—
1933 ..	Gallipoli 18	Ranee 6	Waratah 4	Nabawa 2	Bobin 2	—
1934 ..	Gallipoli 13	Ranee 9	Waratah 7	Sword 5	Bobin 4	Ghurka 4
1935 ..	Ranee 19	Sword 17	Waratah 11	Ghurka 4	Bobin 4	Gallipoli 3
1936 ..	Sword 10	Ranee 9	Waratah 4	Ghurka 3	Baringa 2	—

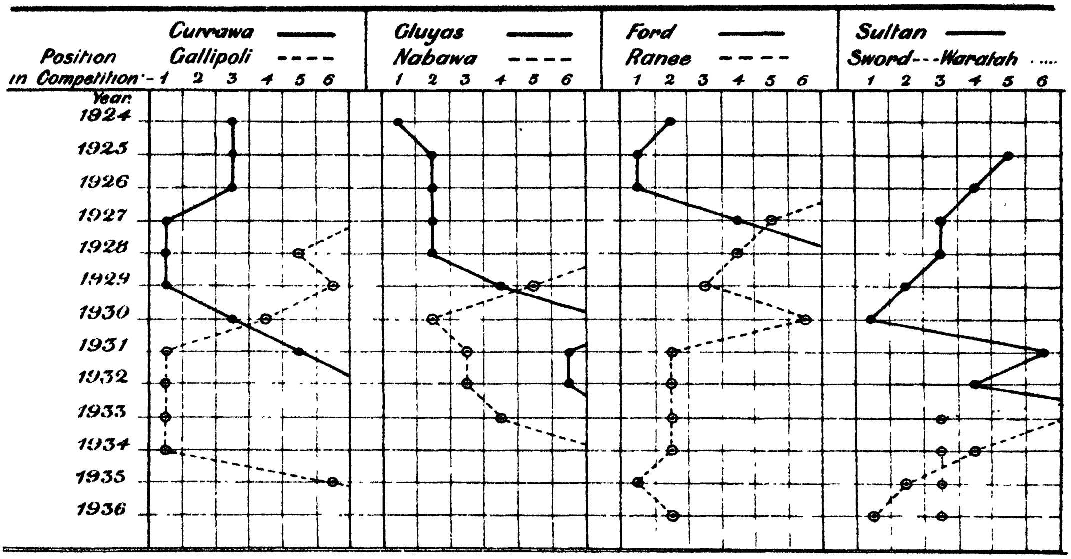
The appended graph will show more clearly the rapid change in popularity of certain varieties and how each variety was replaced by another of somewhat similar type; thus, when Gallipoli, one of the latest maturing wheats ever grown in the district, began to find general favour, farmers ceased growing Currawa, also a comparatively late wheat.

Gluyas was discarded chiefly because of weakness of straw and susceptibility to disease; replaced by Nabawa—a Gluyas-Bunyip crossbred, which was better in these particular characteristics.

Ford was popular for only a short period as it would not yield up to expectations, evidently needing slower maturing conditions, and was displaced by Ranee, which matures very well.

When Sultan proved to be very rust-liable in 1930 it was quickly replaced by other fairly tall, early wheats in Sword and Waratah.

Graph showing Most Popular Wheat Varieties.



Currawa includes Joffre.
Gallipoli includes Free Gallipoli.

Ranee includes Ranee 4H.
Gluyas includes Late Gluyas.

Characteristics and Behaviour of the Most Important Varieties.

(1) CURRAWA.

Although now very little grown, Currawa shows the greatest number of entries during the period of the Chandos Crop Competition. It was bred by H. Pye at Dookie Agricultural College, Victoria, chiefly for north Victorian conditions, but proved very successful in the better rainfall parts of the mallee. The chart and graph show that for three years, 1924 to 1926, it was the third most popular wheat, for the succeeding three years easily the most popular, in fact, in 1928, the year of 137 entries, Currawa entries were one-third of the total, and then quickly lost popularity until, during the last five years, there have only been four entries altogether.

This was due, not to any particular fault of Currawa, but because Gallipoli proved more suitable and more productive. The variety grew very well on all classes of mallee land, being better than most others on sand, was of medium height, with a coarse straw which, unfortunately, showed some tendency to break either low down or at the head, but which was an excellent burning straw, and so very useful in the destruction of mallee shoots on new land.

Currawa is fairly disease resistant, and now that Gallipoli has been discarded, there is no other variety at present which quite takes its place. Remarks concerning breeding and characteristics of Currawa apply also to Joffre.

(2) GLUYAS.

During the earlier years of the competition, Gluyas, with its Roseworthy College selection, Late Gluyas was among the most useful in this district and is the variety with the second greatest number of entries. It is definitely of Mediterranean type, whence it probably came originally. In 1924, when it was the most popular variety, 23 per cent. of the total entries were Gluyas. For the succeeding four years it took second place in popularity, and then rapidly declined until, for the last four years, there have been no entries at all.

Gluyas was hardy and drought resistant, very suitable for the development of mallee land under rough conditions, and for late seeding, or on new unfallowed or poorly prepared land, there has probably never been a better wheat. Its chief faults were weakness of the straw and extreme susceptibility to flag smut, which led to its replacement by Nabawa—flag smut resistant and with stronger straw, but which did not quite satisfactorily replace it in all other respects. At present there is some inquiry from farmers for seed of Gluyas, and it may regain some of its lost popularity.

(3) RANEE.

Ranee was bred by the Victorian Department of Agriculture at Werribee Research Farm from Federation x Indian F. It appeared first in this competition in 1925, soon after its release from Werribee, and gained steadily in popularity until in 1931 it was the second most popular wheat in the competition. This position it retained until 1935, when it became the most popular, with 28 per cent. of the total number of entries. Last year the percentage of Ranee entries was the same, although it had been replaced in first position by Sword.

Early selections showed much variation in height of plant and type of ear, but this was corrected in the later selection, Ranee 4H. In aggregate it is the third most popular variety of the Chandos competition. Vigorous, though short strawed, hardy and productive, though disease susceptible, finishing well and easily harvested, it has been the most consistently popular of all varieties, and at present is one of the outstanding wheats throughout the whole of the Murray Mallee district.

(4) GALLIPOLI.

Gallipoli was also bred at Werribee from Clubhead x Yandilla King. It appeared in Chandos during the same year as Ranee; for a time was not much favoured and then quickly became the most popular wheat, being first in the four years, 1931-1934, the percentages of Gallipoli to total entries during these years being 26, 29, 42, and 27.

Gallipoli yields remarkably well for so late-maturing a wheat in this district, stands well, and though susceptible to diseases, is usually not greatly affected by them. Early selections were hard to reap, but Free Gallipoli selections are much better though still holding the grain well. During the later period of its popularity it was realised that Gallipoli produced a very poor quality of flour and that there was danger of reduced prices and loss of markets if the percentage of Gallipoli in South Australian wheat became too great.

Considerable publicity was given to this fact by the Agricultural Department, the press and the millers. The result was remarkable; Gallipoli quickly lost popularity, and in this competition there were only three entries in 1935 and none in 1936.

(5) SULTAN.

Sultan, with a total of 88 entries, promised for a time to become the most popular mallee wheat. It was bred at Roseworthy Agricultural College from Caliph x King's White, and is an excellent dual purpose wheat for grain and hay. Sultan stools well, has strong, tall, solid straw, and usually matures good grain in spite of disease susceptibility. It was first seen in the Chandos competition in 1925, steadily gaining in popularity each year until in 1930 it was in first place with about 20 per cent. of the total entries.

A severe outbreak of rust late in the season of 1930 proved Sultan to be very susceptible and many crops were greatly damaged. Although rust is seldom dangerous in the district farmers were alarmed and the majority ceased to sow Sultan. During the subsequent six years of the competition there has been a total of only 10 entries. Except for this one bad fault Sultan is a very suitable wheat for mallee conditions.

(6) FORD.

Very popular at the beginning of the competition period, with 16 per cent. of the total entries in 1924, 28 per cent. in 1925, and 27 per cent. in 1926, Ford was thoroughly tried out by Chandos district farmers. Tall and very attractive, it was bred at Roseworthy from (Fan x Comeback) x Crossbred 53. Though resistant to both rust and flag smut, farmers quickly realised that Ford did not yield nearly so well as appeared likely. It seems that the dry spring and early summer weather, with the resultant quick ripening of wheat crops so common here, did not suit it, though in many parts of South Australia and other States it has done very well. Ford was discarded, and for the last seven years there have been no entries.

(7) Nabawa.

Nabawa, bred from Gluyas x Bunyip, took the place of Gluyas because of its resistance to flag smut and of somewhat better, though still weak, straw. It appears to be very drought resistant, showing to greatest advantage in the dry years. In the lower rainfall parts of the mallee Nabawa remains an excellent wheat, but in the Chandos district it has never been either very outstanding or popular, the best year being 1930, when it provided 15 per cent. of the total entries. During recent years it has largely been replaced by Sword and Waratah.

(8) Waratah.

Waratah is another Gluyas crossbred, developed in New South Wales from Gluyas x Hudson's Early Purple Straw. It has been in this competition each year from 1928, but has only been of importance in the last four years, during which it has taken third place each year in order of popularity. Waratah is very similar to Gluyas in growth and appearance, susceptible to disease, but tall and vigorous, maturing and yielding well, although some grain usually sheds. Waratah is not liked by millers, and this is likely to reduce its popularity.

(9) Sword.

Of fairly recent origin, Sword was bred at Roseworthy Agricultural College from Sultan x Ford and appears to combine the good qualities of both parents. Thus it has the disease resistance of Ford with the good grain maturing and finishing qualities of Sultan. It usually yields well, although the grain is likely to shake somewhat.

Appearing first in the Chandos competition in 1933, it gained rapidly in popularity, being in second place in 1935, when 11 of the leading 20 crops were of Sword, and in first place last year with 31 per cent. of total entries. It is likely that Sword will remain for some time among the most popular wheats of this district.

(10) Caliph.

Caliph was bred at Roseworthy from Marshall's No. 3 x King's White. It has never been very popular in the Chandos competition, although there were some entries every year from 1924 to 1933. Like Sultan, which it resembles in most respects, it is very susceptible to rust, and so is not likely to be sown very largely.

There are no other wheat varieties which have been of any great importance in this competition. At present, of all varieties, Sword, Ranee, and Waratah are the most popular, while others which have shown some promise during more recent years are Sepoy, Ghurka, Bobin, Baringa, and Bencubbin.

Dundee, now becoming very popular in parts of South Australia, has not yet appeared here, but is likely to do so very shortly.

The number of varieties being shown in the competition is declining. Numbers each year have been:—

	Varieties.		Varieties.
1924	25	1931	23
1925	17	1932	19
1926	17	1933	16
1927	19	1934	16
1928	32	1935	14
1929	27	1936	9
1930	18		

This is one of the many ways in which the value of the competition is being shown, a greater number of the farmers sowing the varieties which the competition is proving to be successful.

Undoubtedly the correct procedure is to sow the main crop with proved varieties and to test the new ones on small areas, only discarding the standard wheats when others have proved superior after trial over several seasons.

(To be continued.)

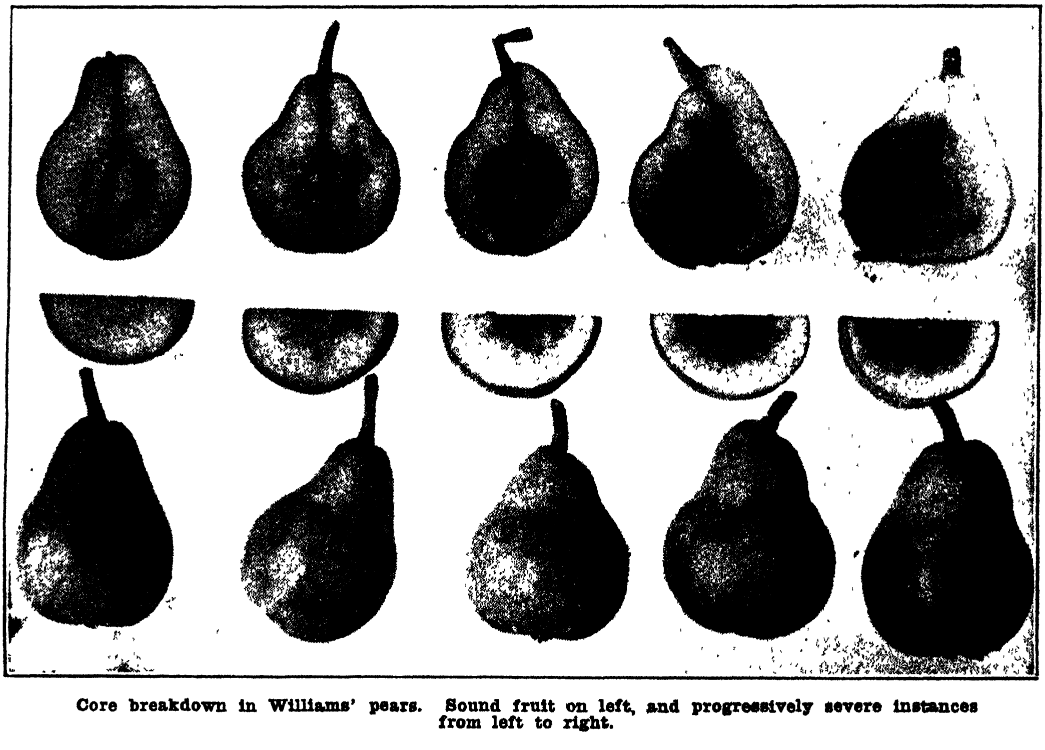
Shipment of Williams' (Duchess) Pears from South Australia to United Kingdom, 1937

[By A. G. STRICKLAND, M.Agr.Sc., Chief Horticulturist and State Supervising Officer (Fruit), South Australia.]

During the current apple and pear export season two major shipments of South Australian Williams' pears were forwarded to United Kingdom. The *City of Manchester* sailed on 12th February carrying 15,146 cases, and the *Melbourne Star* on the same date with a consignment of 4,373 cases.

These shipments of Williams' pears are regarded to be the most successful yet forwarded from this State, and it is considered that a general report will be of interest. This report covers data collected during picking, packing and inspection, results obtained from storage and ripening trials with locally-stored check cases withdrawn at random from certain of the overseas consignments, and comments on the out-turn of the fruit on arrival at its destination.

The Williams' pear is characterised by a very much shorter potential storage life than that of other varieties of pear commonly shipped to overseas destinations. It has been shown by Trout and Tindale* that when picked, packed, pre-cooled and generally handled under ideal conditions, the maximum period for which the Williams' variety may be cool stored (at 30°-32° F.) and then ripened normally on removal to the requisite ripening temperature of 55°-65° F. is 12 weeks. There is no "margin of safety" for Williams' pears exported to United Kingdom, and successful shipment of this variety depends



Core breakdown in Williams' pears. Sound fruit on left, and progressively severe instances from left to right.

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*"The Cool Storage, Ripening and Handling of Pears," *Journal of Agriculture*, Victoria, Jan., 1934.

on close approach to ideal handling and treatment. The pears must be picked in hard, dark-green condition, pre-cooled within a few hours of picking (preferably prior to packing), kept cool until placed on shipboard, and carried by fast steamer at a temperature of 30°-32° F.

A few days delay in pre-cooling after fruit has been picked may not appear vastly important to the grower or packer; this delay will, however, shorten the potential storage life of the fruit by several weeks, and although such fruit may still sometimes land in United Kingdom in apparently firm condition, it may develop scald or core breakdown (see Figure) instead of ripening normally.

Overseas reports as to the out-turn of Williams' pears from the two vessels mentioned are laudatory, and indicate that all people concerned with the preparation and inspection of fruit at the South Australian end co-operated to give the fruit every chance of sound arrival.

In the succeeding pages reference is made to several phases of this year's export of Williams' pears.

Preparation for Export.

Long before fruit was ready to pick, growers, packers, merchants and others were advised in detail as to the requirements for successful export; the importance of daily delivery of picked fruit to store for pre-cooling was particularly stressed. At the commencement of picking, as many officers as were available concentrated on supervisory and educational work in the orchards and packing sheds; advice was given in regard to maturity, packing and other matters, and every effort was made to ensure quick delivery of fruit to cold store.

Commerce Act inspection was carried out at several cool stores and at the ship side, and inspectors were instructed to pay particular attention to maturity. Ground colour is the best guide to maturity of Williams' pears, and fruit which showed even the slightest tinge of yellowing was incontinently rejected. For the first time inspectors were equipped with colour charts showing the subtle gradations of colour through which a pear passes during ripening, *i.e.*, from dark-green, through various shades of green-yellow to full yellow when ripe. As a Williams' pear will ripen fully in six or seven days at normal orchard temperatures, it will not surprise readers to learn that rejected consignments frequently contained a proportion of fruit in fully ripe, eating condition.

A total quantity of 23,467 cases of W.B.C. pears were submitted for export on the *City of Manchester* and *Melbourne Star*, and of this quantity 3,948 cases, representing 16.8 per cent. of submissions, were rejected. This percentage of rejections may appear somewhat high, but as most of the rejections were made on account of over-maturity, the volume of rejections must be regarded as an important contributing factor to the excellent out-turn in United Kingdom.

On the other hand, the heavy rejections indicate that, despite educational measures, certain growers and exporters were not fully seized with the importance of ideal handling for the variety of pear concerned.

In this connection, it should also be pointed out that officers travelling amongst orchards and packing sheds were able to prevent the packing of a very large quantity of over-mature and otherwise unsuitable fruit. Without this district supervision, it is certain that rejections of packed fruit in cold stores and at the ship side would have assumed even larger proportions.

During loading of vessels the core temperatures of all consignments were checked, and it is of interest to report that all fruit was pre-cooled and presented for shipment with a satisfactorily low core temperature.

Land Storage Trial on Check Cases from Overseas Consignments.

Through the courtesy of the Manager of the Government Produce Department (Mr. G. A. W. Pope) check cases were withdrawn at random from a number of bulk consignments destined for United Kingdom and obtained from different districts, and such check cases stored in the experimental cool chamber at Light Square.

TABLE.—*Maturity of Pears* ex *Store and Ripening Behaviour.*

Grower or Packing Shed.	Date Fruit Received in Cold Store *ex* Packing Shed.	Colour Grading of Ten Fruit Sample on Withdrawal from Cool Store. No. of Fruits out of Ten Graded.				Degree of Ripeness.†	No. of Fruits (in Sample of Ten) which Developed Core Breakdown.	Flavour.
		2B*	3B*	4B*	4A*			
1	6/2/37	10	—	—	—	1 to 2	Nil	Good, gritty
2	6/2/37	8	2	—	—	1	Nil	Poor, gritty
3	8/2/37	8	2	—	—	1	Nil	Poor
4	3/2/37	7	2	1	—	3	Nil	Good
5	3/2/37	6	4	—	—	2 and 3	Nil	Fair
6	4/2/37	5	5	—	—	2 and 3	Nil	Fair
7	2/2/37	3	7	—	—	2 and 3	Nil	Fair
8	3/2/37	5	5	—	—	1 and 2	Nil	Mealy
9	29/1/37	3	7	—	—	3	6	Fair
10	30/1/37	3	7	—	—	3	2	Fair
11	5/2/37	2	8	—	—	1 and 2	Nil	Very poor, immature
12	29/1/37	2	7	1	—	1, 2, and 3	7	Fair
13	4/2/37	—	10	—	—	2 and 3	9	Fair
14	5/2/37	—	10	—	—	4	Nil	Excellent
15	2/2/37	—	9	1	—	2	6	Fair
16	3/2/37	—	8	2	—	2 and 3	1	Fair
17	6/2/37	—	9	1	—	1 and 2	2	Irregular, immature
18	3/2/37	—	9	1	—	3	Nil	Good
19	4/2/37	—	6	4	—	2	Nil	Fair
20	6/2/37	—	6	3	1	2 and 3	Nil	Very good
21	5/2/37	—	7	3	—	3	1	Good
22	5/2/37	—	7	2	1	2	Nil	Good
23	5/2/37	—	5	5	—	2	Nil	Fair
24	4/2/37	—	5	4	1	1, 2, and 3	Nil	Good
25	4/2/37	—	5	3	2	2 and 3	1	Good
26	1/2/37	—	3	5	2	1, 2, and 3	6	Good
27	6/2/37	—	4	6	—	3	Nil	Fair
28	4/2/37	—	4	6	—	3	8	Good
29	5/2/37	—	4	5	1	4	10	Fair
30	2/2/37	—	3	5	1	3	9	Fair
31	3/2/37	—	2	6	2	3	4	Bad

2B* Green, faint tinge of yellow.
3B* Green, more yellow than 2B.
4B* Yellow-green
4A* Full yellow.

†1 Still showing tinge of green and tending to hardness.
2 } Intermediate grades
3 }
4 Full, soft ripe.

This check fruit was held at a temperature of 30°-32° F. and carefully examined at the time of arrival of the overseas boats at their port of discharge by Messrs. H. K. Kemp, Research Officer, and N. R. Quinn, Horticultural Adviser. Samples of the fruit were then held and ripened at a satisfactory ripening temperature to determine whether or not normal ripening would ensue.

The data obtained as a result of this trial was most useful and, as will be shown, was confirmatory of reports received as to overseas arrival condition of the bulk lines.

(*a*) MATURITY OF FRUIT.

Inspection of land-stored check cases at the time of arrival of bulk lines in United Kingdom showed the fruit to be generally in hard, green condition, many of the lines having the appearance of freshly packed fruit, except for some bruising in top layers. The maturity of the fruit as judged by ground colour varied according to grower from hard, dark green to predominantly yellow. The approximate variation in order of maturity judged on these standards is shown in the third column of the Table—growers or packing sheds being designated by numbers 1 to 31. In the case of more mature lines, odd instances of fully yellow fruit seemed to be due to infestation with Codling Moth.

(*b*) RIPENING BEHAVIOUR.

The behaviour of samples withdrawn for ripening purposes was generally in accordance with that to be expected from the maturity as judged by colour of fruit when withdrawn from cool store. That is to say, fruit judged to be more forward *ex* cold store on the basis of ground colour ripened more quickly and was in isolated instances prone to develop core breakdown during ripening process.

(*c*) APPEARANCE OF THE PACK AND BRUISING.

Examination of this fruit *ex* cool store showed freedom from bruising except in outside layers where the fruit was in contact with ends, sides, top or bottom of the case. Bruising and marking of fruit in outside layers may be regarded as one of the main defects in the pack, and one which must be rectified in future seasons.

The types of bruising noted were firstly, a "striped" blemish where fruit had been injured through contact with corrugated cardboard, and secondly, a bruising where the calyx ends of pears contacted with the ends of cases. These blemishes are of importance in that they are, by virtue of their location, noted as soon as the case is opened, and owing to the fact that they became more unsightly as fruit is ripened after removal from cool store or the ship's hold.

Of the check cases stored in Adelaide, only three were free from corrugated cardboard injury. Where the injury occurred there was considerable variation in degree, and generally, the more pronounced the bulge, the more serious was corrugated cardboard blemish. In instances where cases had a very large bulge, almost every fruit on top and bottom, as well as a number of fruits on the side, showed striped bruising.

Where bulge was not so marked, the injury occurred most frequently at the ends of top layers, indicating that the operation of lidding and nailing down is related to its incidence. Suggestions as to various means of reducing this type of injury will be advanced later, but it is patent that a great deal of unnecessary injury could be avoided if "nailing presses" were more generally used.

The type of bruising which occurred owing to contact between the calyx extremities of pears and the case ends was not absent from any pack, but was, as would be expected, more pronounced in the tighter packs. Here again, it is probable that this type of bruising would be less common if nailing presses were used for the lidding operation.

In connection with bruising, one observation is of great importance; fruit which was less forward in accordance with classifications in the Table was also most free from bruising. Thus, by packing only fruit which is hard and dark-green, the packer ensures not only sound condition and normal ripening at the overseas destination, but also packs an article which is far less subject to bruising.

Extract from Overseas Report on Out-turn of Fruit.

The following extracts from reports by Mr. W. M. Carne and Inspection Officers in London and received through the Agent-General (Mr. C. McCann) are of especial interest in view of the confirmatory results obtained in the land storage experiments described in the preceding section.

The *Melbourne Star* left Adelaide on the 12th February and discharged at London on the 19th March. Period in ship, 35 days.

GENERAL.

The fruit was all packed in the softwood wired standard boxes, showing variable bulges and weights. Variations in weight from 46-52lbs. gross were noted. It was obvious that the heavier packs exerted too much strain on the boxes. The bulged lids were too short for proper nailing and, consequently, were barely, or not at all, penetrated by the nails at one end. The cleats showed a tendency to break and the box nails to draw, so that in many cases they were held together only by the wires. Measurement of boxes from competing countries, such as the Argentine and South Africa, show that the Commonwealth specification for this box is not satisfactory for a pack of 40lbs. and over. The box timbers are rather too light, but the main defects are the lids, which should be at least 19½in. long, and the cleats, which are too narrow and liable to break. South African cleats are 1in. wide and Argentine 1½in., and in the latter case are usually stitched to the lid. South Australia is to be congratulated on an attempt to provide a net weight comparable with that of competitors, but it appears that the Commonwealth standard pear box is not suitable for this weight and should be modified.

QUALITY.

The quality of the fruit on the whole was very good and many lines deserved to be graded "Extra Fancy." Some showed tree markings, old and new scab spotting, and some spray residues and spotting, but not excessively. Russet was well within limits.

CONDITION.

On the whole the fruit landed in good condition, the main defect being case marking and contact bruising. Inspection showed that, generally speaking, these bruises and marks increase with the size of the bulge. In almost every box the top and bottom layers were definitely marked. On discharge, these defects did not appear serious. The maturity was generally good, the pears being hard and green, with little variation in most lines, with some boxes showing ground colour beginning to break. One line, however, showed a definite breaking of the colour at discharge.

CONDITION ON THE 23RD MARCH.

By the 23rd March one line of fruit, which had started to ripen on the boat, was well forward and very badly marked, contact marks and bruises showing up deep brown. On the 29th March this fruit was in very bad condition, not only marked, but scalded, developing internal breakdown, and had ripened with a most unpleasant flavour. The bulk of the other lines was still good on that date. Some boxes of several lines artificially ripened developed a very fine flavour, but all showed more or less severe dark marking as the fruit coloured. One line appeared to be too immature to ripen properly and remained green and wilted after exposure of 2-3 days at 65°.

While the maturity and the gross weight of the fruit was very satisfactory, it must be admitted that the tendency of the boxes to break down and of the fruit to be badly contact marked justifies consideration both of the boxes and the pack. As already stated, the box built according to the specification is not suitable for a high weight pack. Secondly, the South Australian fruit was packed in flat layers. This type of pack is not suitble for a heavy bulged pack. Attention should be given to the introduction of the crown pack used in North and South America. This, however, will not be possible unless the box specification is amended so as to allow at least a longer lid. It may be pointed out that the crown pack is universal in North and South America.

South Africa is packing Williams' and other pears with a high bulge in a box with an over-size lid, but is not using the crown pack, hence the African Williams' are subject to bruising in the same way as the Australian. It is considered by some that the American pear, whether grown in Canada, United States of America or the Argentine, is less subject to bruising than the Australian and South African, but this would require demonstration. The real demonstrable difference in the packs from those countries is that bruising is slight where the crown pack is used, and heavy where it is not used.

MARKET REACTION.

The market was very pleased with the out-turn of the South Australian fruit.

It may be stated that the artificially ripened South Australian pears were quite equal to the best South African in flavour, and probably superior to the Argentine. Now that South Australia has overcome the problem of handling pears so that they arrive in good maturity, has produced a pack averaging in the neighbourhood of 42lbs., the next stage is to solve the problem of bruising.

The *City of Manchester* sailed from Adelaide on the 12th February and discharged at London on the 23rd March, and at Liverpool on the 29th March. Period in ship to London, 39 days.

GENERAL.

The comments on the box and its liability to breakages with heavy packs made in relation to the pears *ex* the *Melbourne Star* apply also to this shipment.

WILLIAMS'.

Generally very good quality. A few lines showed a little new or old scab and some orchard blemishes, while a trace of Codling Moth was noted. The maturity was more uneven than in the fruit *ex* the *Melbourne Star*, and some slightly advanced pears were found in all lines. Fortunately, the arrival of this fruit immediately before Easter enabled the forward fruit to fetch reasonable prices when marketed in time. Most lines showed more or less bruising, particularly on the top and bottom layers, and in the heavier packs it was more or less general through the boxes.

Future Pear Exports.

Evidence obtained by local experiment, and as a result of inspection of pears on arrival in United Kingdom, points to excessive bruising as the most important defect in 1937 shipments. It is essential that steps be taken to remedy this defect in future shipments, and in this connection the following suggestions must be given full consideration.

(1) *Close Attention to Picking Maturity.*—It has been shown that within limits the more forward the fruit the greater is its liability to case blemishing.

(2) The more general use of lidding presses and, in so far as is possible, the adoption of a modified "crown" pack.

(3) Increase in the length of the "pear" case lid from 19¼in. to 19½in., *i.e.*, ¼in. longer than the case itself, and of the width of the cleats to approximately 1in.

(4) The experimental use of protective packing material other than corrugated cardboard; in this regard, the envelope type wood wool-filled pad is worthy of a trial.

Analyses of Dry Pickling Compounds.

It is required, under Regulations of the Pest Destroyers Act of South Australia, that any copper compound sold for the dry control or prevention of fungus disease in cereals shall conform to the following mentioned standards:—

1. The amount of copper in the compounds is not to be less than 50 per cent. in the separate or a combined form of basic carbonate, basic sulphate, and/or oxychloride. The packages must be branded to indicate the percentages.

2. Each of the three substances is insoluble in water—this is necessary—and to insure as far as practicable that they shall be kept pure from copper in a form which will dissolve in water—ordinary copper sulphate (bluestone), for instance—it is illegal for more than ¼ per cent. of the water soluble copper to be present.

3. A reasonably fine state of subdivision is insisted upon; the requirement being that at least 97½ per cent. of the compound should be in sufficiently small particles to pass through a standard I.M.M. 200 mesh sieve.

During the last few months 12 samples of copper pickling preparations have been procured locally by the Department of Agriculture, and submitted to analyses by the Department of Chemistry. The group, which is a fairly representative one, includes, as will be observed, some of the best-known brands, not only of the State, but of the Commonwealth.

The results are interesting. In none of the 12 samples did the content of water soluble copper exceed the limit prescribed by Regulation; nor were the requirements under the heading of "fineness" departed from. Total copper, however, although satisfactory in nine instances, fell short of the standard in the other three. The deficiencies were in "Kilspor," .2 per cent.; "Bunticide," .3 per cent.; and "Aero," 2.3 per cent.

RESULTS.

Brand.	Moisture.	Retained on 200 1.M.M. Mesh Sieve.	Total Copper.	Water Soluble-Copper.
	%	%	%	%
F. A. Blair's Copper Carbonate	1·5	0·3	50·5	0·01
" Sporetox "	3·2	2·3	51·3	0·01
" Kilspor "	0·9	0·6	49·8	0·01
" Bunticide "	1·9	0·7	49·7	0·01
" Smutol " Oxychloride	1·1	0·2	52·6	0·01
" Sickle "	2·7	0·1	52·5	0·01
" Dollman's Dry Pickle "	1·7	0·2	53·1	0·01
Faulding's Copper Carbonate	1·7	0·1	50·9	Nil
" Kleenkrop "	2·0	1·8	51·1	Trace
"Aero "	1·4	1·9	47·7	0·02
" Cresco "	3·1	1·4	51·7	0·02
" Vallo " Anti-Bunt	4·1	2·5	51·0	0·02

Tobacco Growing in the Murray Irrigation Areas from the year 1931 to 1937

[R. E. Courthope Giles, Tobacco Instructor.]

Attempts have been made during the past six years to develop the Tobacco Growing Industry in the Murray Areas. It will be seen from the following article that the possibility of successful production is principally governed by the quality of the soil.

Only two small areas have so far given complete satisfaction, namely, the White Murray sand, found close to the Murray River, east of Berri, and a light sandy loam in the Loveday Area. The experiments throughout have been marked by their freedom from disease.

W. McGillivray's plot of Dungowan variety at Barmera returned 1,000lbs. per acre.

Downy Mildew made its appearance in seed beds during the 1935-1936 season at the Berri Experimental Orchard, but was brought under control by the application of Benzol fumes. This outbreak was entirely due to excessive humidity in the frames, and no trace of Mildew has ever been found under field conditions.

Tobacco growing was first attempted, in the Murray Irrigation Area, in the Cobdogla section by a commercial concern which planted 70 acres during the 1931-32 season and from which some 33,600lbs. of cured leaf was obtained. Although the yield per acre was excellent, the results were far from satisfactory from a financial standpoint, but proved conclusively that good smoking tobacco of the flue-cured Virginia type could, with proper care and attention, be produced on the Murray sand in South Australia.

Unfortunately, this first attempt at tobacco growing was made upon a very large scale as a commercial enterprise, without the necessary experience of the business having been first obtained. Although plants grew well and gave excellent yields of sound leaf, labour troubles, coupled with a lack of knowledge of the picking and curing process, were sufficiently damaging to turn what should have been a remunerative venture into a financial failure.

Leaf that was picked ripe and properly cured and graded sold well and was favourably reported on by various tobacco manufacturers. Approximately half the crop was cured in an immature state, and being sold ungraded, realised poor prices. The whole amount was disposed of however, which speaks well for the smoking qualities of the leaf, but the appearance was marred to a certain extent by thrip marks; a difficulty that at the present time could be overcome in a satisfactory manner. No doubt the texture of the leaf would have been improved, had it been possible to use an overhead sprinkler system of irrigation, instead of the flood method, but sufficient water pressure to work the sprays was, and still is, unobtainable. The provision of adequate windbreaks would have been of great assistance to general plant growth; it would also have prevented a good deal of breakage, and have given improved texture to the cured article.

White Stem Orinoco Tobacco, grown by H. Wilkinson, Loveday, produced good quality leaf.

During the 1932-33 and 1933-34 seasons, no further attempt was made to grow tobacco in the Murray Irrigation Areas. In 1934 the Commonwealth Government made a grant to the various States to assist in the fostering of the industry, and the South Australian Department of Agriculture commenced experimental work in this region.

With the kind assistance of a number of fruitgrowers, five small scale experimental plots were planted with locally grown seedlings during November and December, 1934, at Cobdogla, Loveday, Barmera, Winkie and Berri, with varying degrees of success, the leaf being treated in an improvised curing barn at the Government Experimental Orchard at Berri.

The most successful results were obtained with a plot of Hickory Pryor, grown by Mr. L. T. O'Malley at Berri upon grey Murray sand. The plants were well cared for, and gave an excellent yield of sound bright leaf at the rate of 600lbs. per acre. This plot was well sheltered from the wind, the plants being fully protected by trellised vines and fruit trees.

The Barmera plot, conducted by Mr. Wm. McGillivray, gave a return at the rate of 1,000lbs. per acre of the Dungowan variety, but owing to the presence of an excess of nitrogen above the requirements for tobacco, the ripening process was unduly delayed. In consequence, the cured leaf was of inferior quality, blemished, dark in colour, and of poor texture.

Three plots were complete failures, owing partly to the inability of the growers to give the plants the necessary amount of attention, water not always being available when required, and partly the lack of adequate protection from the high winds prevalent in this locality.

A considerable amount of interest was aroused by these experiments, however, and in the following season (1935-36) a further series of experiments were conducted on a slightly larger scale by Messrs. O. J. Mayger and I. R. Ker near Barmera and Messrs. H. Wilkinson and L. Kerly at Loveday.

These plots were planted with light Virginia type tobacco from locally grown seedlings, and were extremely well conducted.

Insect pests were particularly troublesome, the plants being attacked by cut worm, stem borer, leaf miner and thrips, but despite these difficulties, which were in turn overcome by means of poison bait, dusting and spraying, the crops grew well and were brought to maturity.

Assistance during the harvesting period was given by officers of the Department of Agriculture, who cured the leaf in barns made available for that purpose, and who assisted with the grading, baling and marketing of the leaf, which was disposed of to a Melbourne firm of manufacturers. The best results were obtained from crops of Bonanza and White Stem Orinoco tobacco grown on light sand in the Loveday Area. The Barmera plots, being established upon a heavier type of sand, were more difficult to cure, but Bright Mahogany leaf was obtained from Hickory Pryor plants grown by Mr. Mayger.

Curing results would undoubtedly have been much better had the plots been large enough to provide sufficient leaf to fill the barn, and so obviate the necessity for curing small lots of the various types of tobacco grown upon dissimilar soils.

It would now appear from the foregoing experiments that the only soils in the Irrigation Areas giving entirely satisfactory results are the White Murray sands as found on the eastern bank of the river at Berri, and a light sand found in the Loveday Area. Further experiments are being conducted on these soils by Mr. Crisp at Berri and Mr. Wilkinson at Loveday in collaboration with the Department of Agriculture during the current 1936-37 season. No trouble was experienced with insect pests, adequate wind breaks were provided, and the results obtained so far are entirely satisfactory. It is possible that tobacco growing may yet prove to be a sound commercial proposition on the Murray, providing that it is confined to areas that are suited to this branch of the Agricultural Industry.

Production of Butter and Cheese.

The production of butter and cheese for March, 1937, was Butter, 1,040,805lbs.; cheese, 645,702lbs.

South Australian Committee of Australian Dairy Produce Board

Dairy Farm Competitions, 1936-37—Conservation of Fodder in Adelaide Hills Districts.

[Judged by ROWLAND HILL, District Agricultural Adviser.]

The following report is presented in connection with the Conservation of Fodder section of the Dairy Farm Competitions conducted throughout the Adelaide Hills district in this State, in the judging of which points were awarded on the following scale:—

	Points.
Hay	30
Ensilage	30
Amount conserved per cow	75
Other crops	15
Total	150

This competition should do much to promote improved carrying capacity of holdings, provided that keener interest is shown by dairymen, and the work of the committee in instituting such a competition should be recognised and full advantage taken of the opportunity offered.

As the stock carrying capacity of the farms is improved, the conservation of fodders and the growing of some cultivated crops become increasingly important, and full benefit cannot be obtained from improved pastures unless their development is coupled with the conservation of an adequate supply of fodder.

To see pastures well grazed and free from dry, unpalatable feed at this time of the year is an indication that full use has been made of the material grown. This practice is the one to be followed, provided that adequate supplies of hay and ensilage have been stored during spring; that is to say, at the time when pasture growth could not be economically handled unless some fields were reserved for the provision of conserved fodders.

Having won the Pasture section of this competition, the farm of Mr. E. A. Farr, of Meadows, is an object lesson in that it has successfully carried the equivalent of 70 head of large stock on an area of 220 acres, of which 45 acres are still virgin scrub land, whilst, in addition, fodder has been conserved in the form of hay and ensilage amounting to approximately 5 tons per beast.

The growing of 9 acres of summer crops, including Japanese millet, Sudan grass and maize, reduced the amount of conserved feed needed, and with such a supply of hay and ensilage still remaining, it appears that many more livestock could have been carried safely.

That a portion of the pasture area has only recently been sown down should be understood and consequently, as time goes on, production will still further increase. That equal results can be obtained from a large area of land in our good rainfall districts is certain. This is a pleasing feature and an indication of the excellent possibilities of small holdings when well handled.

With a large area of this type of land still in its virgin state and a quantity only partially developed, the prospects of carrying a much larger population in the good rainfall areas must be accepted as bright.

Unsuitable harvesting conditions were responsible for the discolouring of much of the hay, and there was undoubtedly some loss of nutriment because of the extended period during which the material was exposed to the weather after cutting.

The Winning Entry.

Commenting on Mr. Farr's entry, Mr. Hill said the hay consisted of 40 tons of well-baled hay, comprising a mixture of oats, wheat, Subterranean clover and Rye grass stored in a closed shed. The clover was rather matured, but otherwise the quality of the hay was quite good.

Table showing the Allocation of Points.

Competitor.	Address.	Hay.					Ensilage.						Amount Con-served per Cow.	Other Crops	Total.
		Suit-ability of Plants	Curing	Stage of Cut-ting.	Appa-rent Nutri-tive Value.	Stor-ing.	Suit-ability of Plants	Succu-lency.	Palat-ability	Aroma	Char-ring.	Mould.			
		5	7	7	7	4	5	5	7	3	5	5	75	15	150
Farr, E. A.	Meadows	4	5	6	5	3·75	4·5	5	6·5	2·75	5	4·75	75	15	142·25
Walsh, H. R.	Mount Barker	4	5	6	5·5	2·5	4·5	5	6	2·5	5	3·75	50	12	111·75
Peters, H. B..........	Mount Compass	4	6	6	6	3·25	—	—	—	—	—	—	60	—	85·25
Buckley, W. R.	Charleston	4	5·5	5	5	3·5	—	—	—	—	—	—	50	—	73
Dunne, J. P.	Mount Barker	4	4·5	5·5	5	4	—	—	—	—	—	—	35	—	58

Fifteen tons of loose Meadow hay, comprising Subterranean clover, Rye grass, Soft-brome grass, Sterile-brome grass and Silver grass had been cut at the correct time, but was discoloured. Forty-five tons of baled Meadow hay, consisting of Perennial Rye grass, Subterranean clover and only a trace of the inferior annual grasses stored in a closed shed, but slightly discoloured by rain when in the field. Forty tons of Meadow hay stacked in the field consisted of Subterranean clover, Cluster clover, Striatum clover, Hop clover, both Soft and Sterile-brome grass, Silver grass and Rye grass. Because of the higher percentage of annual grasses, this should have been cut earlier, but with the amount of ensilage and hay stacked on the holding it would have been difficult to cut all the material at the correct time. Salt was used freely in all the hay and, with the exception of a 40-ton stack, all was particularly well stored.

Ensilage.—The 200 tons of ensilage were in two stacks and one of about 110 tons near the buildings was being used. There was very little waste and the stack was producing very succulent and palatable feed. At the bottom of the stack there was some slightly sour ensilage which is difficult to avoid unless the roughest type of feed is available when the stack is commenced. The most suitable material for the lower layers of an ensilage stack usually becomes available as the stack is being completed, resulting in some charring of the top layers, but in this case the ensilage was very free from that trouble.

A stack of 90 tons in the field had not been opened for use, but had been built by expert hands, and the regular manner in which it had settled down indicated that the quality would be excellent. Both stacks of ensilage consisted of Subterranean clover, Rye grasses, a little Cape weed and annual grasses similar to those found in Meadow hay.

Cultivated crops consisted of 3½ acres of Sudan grass, 2½ acres of Japanese millet, and 3 acres of maize, all of which produced heavy crops, particularly the millet.

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Crystal Brook, Wednesday, 1st September.
Gawler, Thursday, 23rd September.
Denial Bay, Friday, 24th September.
Tailem Bend, Saturday, 25th September.
Balaklava and Dalkey, Saturday, 25th September.
Tailem Bend, Saturday, 25th September.
Waikerie, Saturday, 25th September.
Eudunda, Wednesday, 29th September.
Kapunda, Saturday, 2nd October.
Orroroo, Wednesday, 6th October.
Streaky Bay, Wednesday, 6th October.
Renmark, Wednesday, 6th October.
Karoonda, Wednesday, 6th October.
Murray Bridge, Thursday, 7th October.
Moonta, Saturday, 9th October.
Jamestown, Wednesday, 13th October.
Strathalbyn, Wednesday, 13th October.
Tarlee, Wednesday, 13th October.
Penola, Wednesday, 13th October.
Colton, Wednesday, 13th October.
Loxton, Wednesday, 13th October.
Kimba, Wednesday, 13th October.
Browns Well (Paruna), Saturday, 16th October.
Kingston, Saturday, 16th October.
Pinnaroo, Wednesday, 20th October.
Maitland, Wednesday, 20th October.
Mount Gambier, Wednesday and Thursday, 20th and 21st October.
Willunga, Thursday, 21st October.
Clare, Saturday, 23rd October.
Port Elliot, Saturday, 23rd October.
Minlaton, Wednesday, 27th October.
Tatiara (Bordertown), Wednesday and Thursday, 27th and 28th October.
Millicent, Saturday, 30th October.
Burra, Saturday, 30th October.
Yankalilla, Saturday, 30th October.
Mount Barker, Saturday, 6th November.
Woodside, Saturday, 13th November.
Kalangadoo, Saturday, 13th November.
Mundalla, Wednesday, 9th March, 1938.
Mount Pleasant, Thursday, 17th March, 1938.

Papers Read at Conferences

General Food Value of Milk

[J. Y. Hudd, Adelaide, (Lobethal Dairying Field Day).]

There is a general lack of knowledge among many producers of the food value of milk and the important part it plays in the health of the community, an importance which is growing in value every year. If the producer has a better knowledge of the value of his product, he will be more easily appraised of the necessity for a scientific knowledge in the production and treatment of milk for human consumption, and he would also be in a better position to realise the need for co-operating in educating the public in a greater consumption of milk.

Milk is the only one of the natural foods that is primarily designed as a food. It is accordingly the nearest approach to a "complete" natural food available. On the other hand, it is originally intended for young animals, and is not by itself adequate after the weaning period. This is because it has a few deficiencies, notably in iron, copper and in certain vitamins, and also because its energy value is low on account of its high water content. Nevertheless, milk is an invaluable supplementary food at all stages of life.

Protein, Carbohydrate, and Salts.

Proteins consist of a variety (about 20) of different amino acids; some of these cannot be manufactured in the body and must be supplied preformed in the food. Many proteins are deficient in one or more of these amino acids. Actually, casein, the principal protein of milk, is somewhat deficient in this respect, but is supplied by other proteins, the whole combining to make a dietary protein of the highest biological value. Moreover, the admixture of milk protein greatly improves the biological value of other more deficient food proteins, *e.g.*, the biological value of maize protein has been calculated at 60. The addition of a moderate amount of milk protein raises the value to 87, when the added amount of milk protein should only raise the theoretical value to 70. This shows the value of milk as a supplementary diet.

The fat of milk is remarkable for the large amount of fatty acids it contains, and the highly emulsified nature of the milk fat is a great aid to its digestibility.

The sugar of milk (lactose) has two specific dietary properties—(1) in some peculiar manner it appears to increase the absorption and retention of calcium and phosphorus, (2) it contains galactose, which enters into the composition of nervous tissue. The body cannot convert other sugars to galactose, except in the mammary gland. Galactose must be regarded, therefore, as a dietary essential, at least in growing children, and the sugar of milk should not be too extensively replaced by other sugars, *e.g.*, cane sugar. The fact that cow's milk contains less lactose than human milk may be connected with the fact that the calf is born with its nervous system developed to a greater extent than the human infant.

Milk is an admirable source of all the necessary mineral requirements, with the exception of iron and copper. It is particularly valuable in regard to calcium and phosphorus. Calcium, a necessary element for bone formation, is very unevenly represented in natural foods. Milk and milk products are easily the most prominent source in the diet. It is, in fact, difficult to obtain adequate calcium without at least a portion of milk or milk products in the diet. To obtain the desired daily intake of calcium for a man, it would be necessary to eat 30lbs. of beef, or 40lbs. of rice if nothing else were consumed. About 2ozs. of cheese or 1½ pints of milk would supply this amount. The need for calcium by children is greater than for adults, and it is usually recommended that growing children consume one quart of milk per day, as only in that way are they reasonably certain to obtain adequate calcium. The proportion of calcium to phosphorus in the milk is suitable for obtaining the greatest absorption of both. It should be mentioned, however, that milk is deficient in iron and copper, and as a result young animals kept on a purely milk diet after the normal weaning stage develop anaemia. This, of course, in no way reflects on the value of milk as a supplementary food in a general mixed diet, since the iron will readily be obtained from other sources.

Vitamins.

Milk contains all the vitamins required in human nutrition. However, it is not a really good source of any of them except, perhaps, vitamin A. The relatively small amounts supplied by the milk are, however, a valuable supplement to the total content of the various vitamins in our foods, and milk compares favourably in this respect with many other foods which are wholly deficient in one or more vitamins.

The energy value of milk is low on account of its high water content. The energy value largely depends on the amount of fat—on the average it is about 310 calories per lb. Since an active man requires about 3,000 calories per day he would need to consume about 10lbs. of milk per day if he were attempting to use this as his sole source of energy. On the other hand, milk products have a high energy value, *e.g.*, butter, 3,410 calories per lb.; cheese, 1,950 calories per lb; whole milk powder contains 2,300 calories per lb. These figures compare favourably with such other high energy foods as sugar, 1,760 calories per lb., or flour, 1,600 calories per lb.

Infant Feeding.

The best food for an infant is, of course, mother's milk, provided she has been well nourished. However, it is frequently necessary to use a modified form of cow's milk. The main differences between human and cow's milk are the greater protein concentration in cow's milk and a greater lactose concentration in human milk. The difficulty of the former is overcome by the dilution of cow's milk, but this reduces the carbohydrate and energy values, which have to be supplemented. The whole question of infant feeding is highly complex, but, generally speaking, suitable modified cow's milk supplemented with a little cod liver oil to supply extra vitamin D and orange or tomato juice to supply extra vitamin C is a reasonably satisfactory substitute for mother's milk. At all events, there is no satisfactory alternative to the use of milk or some product derived directly therefrom.

One of the principal uses of milk with the growing child is to supply adequate calcium. For this reason a quart a day is advocated during the growing period. It has, of course, the additional benefits referred to previously. It must be remembered that after weaning milk is not the sole food, but a supplementary food. Its few deficits can therefore be discounted, since these are made up elsewhere in the diet.

Milk is usually very easily digested. It is also palatable, or can easily be made so. Accordingly, it is of very frequent use in all types of illness. Soft curd milk is of particular value in this respect. Why some cows give a "soft curd" milk and others a "hard curd" product is unknown, but the former certainly gives the more satisfactory results. Various forms of treatment tend to result in the production of "soft curd." Boiled milk, and particularly lactic acid milk, gives a soft curd.

This paper has been presented in such a way that it is hoped that it will be of value to both the producer and consumer of milk, because the average consumption per head of the population of the metropolitan area is less than one-half pint per head per day.

Thanks are due to Mr. M. L. Mitchell of the Nutrition Laboratory of the University of Adelaide, to whom the writer is indebted for help in preparing this paper.

Stickfast Flea

The Chief Inspector of Stock (Mr. C. A. Loxton, B.V.Sc.) has issued the appended instructions to poultry keepers whose poultry and premises are in quarantine for "Stickfast Flea."

Owners must fully observe all the directions of an Inspector.

No poultry, crates, boxes or fittings can be removed from a quarantine without the permission in writing of the Inspector and under such conditions as he may impose.

All birds must be kept closed in a yard or run. The houses, runs and nests must be kept clean. Affected birds must be dressed regularly. Satisfactory arrangements must be made for the disposal of poultry manure. Dogs and cats must be excluded from runs and houses, and enclosures where poultry are kept should be ratproof.

The following routine should be carried out in infested premises:—

1. *Affected Birds.*—The fleas attack the bare parts of the face, the comb and wattles, which must be dressed once a week with neatsfoot oil. The dressing can be applied economically with a small brush. If neatsfoot oil is not procurable use castor, linseed or other non-irritating oil.

2. *Disposal of Manure.*—The droppings should be removed at least once a week, but more often if possible. If the floor of the house is not paved, an iron tray should be placed beneath the perches to collect the droppings. The fowl manure should be burned, or if required for fertilising purposes should be placed in a watertight container and covered with water for seven days before use.

3. *Yards and Houses.*—The yards, houses and nests must be kept clean. The yards should be cleaned up once a week and the litter and sweepings burned. It is strongly recommended that the houses should be paved with cement or other impervious material. One dressing of quick lime (hot lime) should be given in the houses. Where the floor is of earth it should be, as far as practicable, kept soaked with water.

4. Boxes used for packing eggs must be kept clean, must not come in contact with poultry and must not be stored in the proximity of poultry.

Reasons for Routine Treatment.—The flea lays eggs principally at night, which fall among the droppings under the perches. The eggs hatch out in four days and the larvae which emerge take shelter among the manure and bury themselves in the ground, where they transform themselves into the pupae. After about 14 days the pupa gives rise to the adult flea which attaches itself to poultry, or if unable to do so, to dogs, cats, or other animals. The life cycle is then repeated. The above routine is devised to destroy the pest during all stages of its development.

Advisory Board.

The monthly meeting of the Advisory Board of Agriculture, held on Wednesday, 26th May, was attended by Hon. A. L. McEwin, M.L.C. (Chairman), Messrs. J. B. Murdoch, F. Coleman, A. J. Cooke, P. J. Baily, S. Shepherd, R. H. Martin, A. J. A. Koch, Professor A. E. V. Richardson, and Professor A. J. Perkins, O.B.E.

Apologies were received from Messrs. W. J. Spafford, A. M. Dawkins, George Jeffrey, and H. N. Wicks.

New Branch at Keyneton.—Approval was given to the formation of a Branch at Keyneton with 31 foundation members.

Branch Closed.—It was decided to close the Branch formerly known as "Glencoe," a new Branch having been formed at Glencoe East.

New Members.—Approval was given to the appointment of the following new members:—Blackheath—H. W. Weckert; Blyth—B. R. Fuller, D. Poysden, W. H. Thomas; Butler—Lawrence C. Teakle; Carey's Gully—L. R. D. Scott; Coonalpyn—E. C. Zanker, E. I. Zanker, E. E. B. Zanker; Glencoe East—G. Byrne, A. E. Carthew; Kangarilla Women's—Mrs. Eunice Gwynne, Miss Marjorie Baker;

Karte—G. Holmes; Karte Women's—Mrs. H. Gale, Mrs. Gregory; Kingston—R. B. Vine, K. H. Hannaford; Kyancutta—Robert P. Hall; Mundalla Women's—Miss Nella Donnell; Nunjikompita—Samuel B. Lang, Edward E. Lang, Arthur R. Watkinson; Pinnaroo Women's—Mrs. J. G. Fisher, Mrs. A. C. Sandow; Port Elliot—J. Wicker, J. R. Addison; Quorn—S. McHugh, F. Pitman, J. E. Schnell, J. W. Castine; Robe—F. Tonkin, D. R. Brown, F. R. Sparrow, C. H. Hansford, A. Watson; Sheaoak Log Women's—Mrs. C. Pope; Tantanoola—T. C. Langley, R. T. Smith, M. Haines; Taplan—Jasper N. Schwerdt; Waikerie—I. McPherson; Wandearah—W. G. Inglis, Ivan Vanstone; Weavers—J. Duncan, H. Giles, R. Giles; Yundi—J. Garrick, W. Simpson; Yurgo—J. G. Jenkins, D. McLean, H. McLeod; Keyneton—P. R. Evans, J. B. Evans, L. R. Evans, M. L. Evans, E. M. A. Evans, D. B. A. Evans, H. L. Evans, J. P. Schutze, A. Dodridge, C. Dodridge, H. Dodridge, H. Herzig, H. B. Munchenburg, P. W. Schultz, H. D. Blenkiron, E. Schutze, R. Lillecrapp, Geoffrey Lillecrapp, L. P. Lillecrapp, K. H. Lillecrapp, M. J. Baker, R. N. Keynes, F. J. Heath, A. J. Heath, O. E. Leschke, H. Reimann, R. M. Fiebiger, C. Fiebiger, R. Jackson, E. Rattaey, P. H. Rattaey.

Several items were taken in Committee.

Waybills for Travelling Stock.

The Minister of Agriculture (Hon. A. P. Blesing, M.L.C.), recently stated that the Travelling Stock Waybills Act, 1911 and 1936, had been gazetted and was now in operation.

His attention had already been drawn to the fact that consignments of stock were being moved from place to place without the necessary Waybill being obtained for the consignment. He desired to impress upon those concerned that, within the hundreds, all stock movements by vehicle, including motor vehicle, must be accompanied by a Waybill. Owners were advised that a Waybill was necessary to stock under the following conditions:—

(1) When they were driven on the hoof from any place within any hundred to any place distant 15 miles or more from the place of departure of the stock; or

(2) When they were conveyed (other than by railway) within any hundred by means of any vehicle to any place; or

(3) When they were driven on the hoof or conveyed (other than by railway) by means of any vehicle from any place outside any hundred to any place outside any hundred which is distant 50 miles or more from the place of departure of stock; or

(4) When they were driven on the hoof or conveyed (other than by railway) by means of any vehicle from any place outside any hundred to any place within any hundred which is distant 15 miles or more from the place of departure of the stock.

The Minister drew attention to a provision in the Act which required the production of a Waybill by every drover (whether owner or not) in charge of or having any stock under his control, which must be produced on demand to any Justice, Inspector, Ranger or member of the Police Force or to the owner or occupier of any land over which he was at the time, or had been, travelling or driving stock. There was a further obligation to retain the Waybill when stock was delivered by the drover and the keeping of same for at least one month after delivery or alternatively to send it to the nearest Police Station.

If a Waybill was lost or destroyed, an Inspector of Stock or a member of the Police Force would issue an Interim Waybill on receiving a written application, the cost being 2s. 6d.

The Minister stated that he had no doubt that the law was being broken through lack of understanding its requirements, but he desired all sheep owners, drovers, and stock agents concerned to know that they must carry out in future the requirements of the Act, otherwise they were liable on conviction to a penalty not exceeding £10.

Herd Testing Results

The Supplement in this Issue contains a record of:—

1. **Production figures, under Official test, of pure bred cows which completed their tests during the quarter ended 31st March, 1937.**
2. **Herd Testing Associations (not official) production figures for months January to March, 1937.**
3. **Annual production figures (not official) of the Southern District Herd Testing Association, 1936-37.**

Below, Mr. H. B. Barlow (Chief Dairy Instructor) reviews the results of the various classes in the Official Tests.

Junior 2 *Year Old* (*Standard* 230*lbs. Fat*).—In this class 41 animals (17 Jerseys, 5 Friesian, 10 A.I.S. and 9 Ayrshire) were submitted to test; 32 cows (17 Jersey, 1 Friesian, 6 A.I.S. and 8 Ayrshire) completed 273 days' test and 24, or 75 per cent., passed the required standard; 1 cow, "Onkaparinga Joy" (C.E. Smart) 384.63lbs. fat—produced in excess of 350lbs. fat (mature standard; 16 Jerseys 1 Friesian, 3 A.I.S. and 4 Ayrshires obtained certificates.

Senior 2 *Year Old* (*Standard* 250*lbs. Fat*).—Nineteen cows (14 Jerseys, 2 Friesian, 2 A.I.S. and 1 Ayrshire) commenced test; 11 cows (8 Jerseys, 2 A.I.S. an 1 Ayrshire) completed 273 days, and 8 Jerseys and 1 Ayrshire reached the required standard; 4 Jerseys and 1 Ayrshire produced in excess of 350lbs. (mature standard). The four top cows were Jerseys, headed by "Ninyeri Bluebell" (E. L. Goode) with 379.40lbs.

Junior 3 *Year Old* (*Standard* 270*lbs. Fat*).—Thirteen cows (8 Jerseys, 1 Friesian, 2 A.I.S. and 2 Ayrshire) were submitted to test; 10 cows (7 Jerseys, 1 Friesian, 1 A.I.S. and 1 Ayrshire) completed 273 days, and 7 Jerseys and 1 Friesian reached the required standard; 5 cows, headed by "Murray Glen Sylvia Beets" (C. J. Morris) 567.12lbs. fat, produced in excess of 350lbs. fat.

Senior 3 *Year Old* (*Standard* 290*lbs. Fat*).—10 cows (4 Jerseys, 1 Friesian, 3 A.I.S. and 2 Ayrshire were submitted, of which 5 cows (2 Jerseys, 2 Ayrshires and 1 A.I.S.) completed 273 days. These 5 cows reached the required standard. Four cows, headed by "Delma Noble Lotus" (E. W. Pfitzner) 459.71lbs. fat, produced in excess of 350lbs. fat.

Junior 4 *Year Old* (*Standard* 310*lbs. Fat*).—Five cows (2 Jerseys, 1 Friesian, 2 A.I.S.) were submitted and 4 cows (2 Jerseys and 2 A.I.S.) completed 273 days; 3 cows (2 Jerseys and 1 A.I.S.) reached the required standard. These three cows all produced in excess of 350lbs. fat, headed by "Kiama Primrose 2nd" (E. & A. Nicholls) 403.33lbs. fat.

Senior 4 *Year Old* (*Standard* 330*lbs. Fat*).—Twelve cows (6 Jerseys, 1 Friesian, 4 A.I.S. and 1 Guernsey) were submitted; 9 cows (4 Jerseys, 4 A.I.S. and 1 Guernsey) completed 273 days; 6 cows (4 Jerseys, 2 A.I.S.) reached the required standard; 4 cows produced in excess of 350lbs. fat, headed by "Hampden Noble's Guitar" (J. A. J. Pfitzner) with 486.65lbs. fat.

Mature Cows (*Standard* 350*lbs. Fat*).—Fifty-seven cows (27 Jerseys, 11 Friesian, 9 A.I.S., 8 Ayrshire and 2 Guernsey) were submitted, of which 33 cows (12 Jersey, 5 Friesian, 8 A.I.S., 6 Ayrshire and 2 Guernsey) completed 273 days; 20 cows (11 Jerseys, 5 Friesians, 3 A.I.S. and 1 Ayrshire) reached the required standard. This group was headed by three Friesians with two outstanding records on top, namely, "Murray Glen Sylvia Topsy (C. J. Morris) with 828.26lbs. fat (State record) and "Murray Glen Netherland Butter Girl" (C. J. Morris) with 726.37lbs. fat.

In all, 157 cows of all ages were submitted for test; 104 completed the full period of 273 days, and 75 passed the required standard.

Summarising the results for the period:—

78 Jerseys	were submitted,	52 completed 273 days and	50 passed the standard.
32 A.I.S.	" "	24 " " "	10 " " "
22 Ayshires	" "	18 " " "	8 " " "
22 Friesians	" "	7 " " "	7 " " "
3 Guernseys	" "	3 " " "	— " " "

The two leading cows in each class are :

	Lbs. Milk.	Average Test.	Lbs. Butterfat
JUNIOR TWO-YEAR-OLD.			
Mr. C. E. Smart's "Onkaparinga Joy", Jersey	7,279½	5·28	384·63
Mr. C. J. Morris' "Murray Glen Echo Triumph", Friesian	10,236	3·34	341·92
SENIOR TWO-YEAR-OLD.			
Mr. E. L. Goode's "Ninyeri Bluebell", Jersey	6,854	5·53	379·40
Mr. A. B. A. Weckert's "Scrub View Dora", Jersey	7,160	5·11	365·95
JUNIOR THREE-YEAR-OLD.			
Mr. C. J. Morris' "Murray Glen Sylvia Beets", Friesian ..	13,156½	4·31	567·12
Mr. R. J. Laing's "Kirami Jennifer's Princess", Jersey...	8,769	5·27	461·92
SENIOR THREE-YEAR-OLD.			
Mr. E. W. Pfitzner's "Delma Noble Lotus", Jersey	7,614	6·04	459·71
Mr. E. O. Hancock's "Glen Belah Heather", Ayrshire ...	8,875½	4·59	407·06
JUNIOR FOUR-YEAR-OLD.			
Messrs. E. and A. Nicholl's "Kiama Primrose 2nd", A.I.S.	9,082½	4·44	403·33
Mr. O. H. Woodward's "Navua Fascination", Jersey	6,701	5·95	398·89
SENIOR FOUR-YEAR-OLD.			
Mr. J. A. J. Pfitzner's "Hampden Noble's Guitar", Jersey	7,617½	6·39	486·65
Mr. C. E. Smart's "Pella Madiera Kelly", Jersey	8,601	5·27	453·56
MATURE COWS.			
Mr. C. J. Morris' "Murray Glen Sylvia Topsy", Friesian..	25,200	3·29	828·26
Mr. C. J. Morris' "Murray Glen Netherland Buttergirl", Friesian..	17,055	4·26	726·37
Mr. C. J. Morris' "Murray Glen Griselda Tulip", Friesian.	12,207	4·64	566·23

These particular figures of production should not be allowed to pass without special attention being drawn to a new record which has been established in South Australia by Mr. C. J. Morris' "Murray Glen Sylvia Topsy", a mature Friesian cow, with 828·26lbs. of butterfat to her credit. Mr. Morris is to be congratulated not only upon being the owner of this record-breaking cow, but upon being her breeder as well.

For the purpose of comparison, the following are the names of the cows holding state records, irrespective of breed, in their respective classes as at 31st March, 1937 :—

Junior Two-year-old.—" Pulluwewal Jean " (Mrs. A. E. Bowman), Jersey, 516·66lbs. fat.

Senior Two-year-old.—" Lanacoona Brown May " (C. E. Verco), Jersey, 633·73lbs. fat.

Junior Three-year-old.—" Murray Glen Beets Superior " (C. J. Morris), Friesian, 594·52lbs. fat.

Senior Three-year-old.—" Murray Glen Princess Maggie " (C. J. Morris), Friesian, 607·66lbs. fat.

Junior Four-year-old.—" Kiama Robin 2nd " (E. and A. Nicholls), A.I.S., 703·03lbs. fat.

Senior Four-year-old.—" Murray Glen Princess Maggie " (C. J. Morris), Friesian, 701·02lbs. fat.

Mature.—" Murray Glen Sylvia Topsy " (C. J. Morris), Friesian, 828·26lbs. fat.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate matter concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. .grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100lbs.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bord.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements af the stock.

Test.	No. Eggs Laid Month of April, 1937.	No. Eggs Laid Month of May, 1937.	Total No. Eggs Laid from 1st April 1937 to 31st May, 1937.
A.	427	536	963
B.	334	411	745
C.	407	474	881
D.	260	367	627
E.	236	328	564

	Value of Eggs Laid for the Month of—				Cost of Food Fed for the Month of—				Return Above Cost of Feeding—				Total Return Above Cost of Feeding from 1st April to 31st May, 1937.		
		£	*s.*	*d.*		£	*s.*	*d.*		£	*s.*	*d.*	£	*s.*	*d.*
A.	April ..	2	11	2	April ..	1	2	10	April ..	1	8	4	3	18	0
	May ..	3	12	7	May ..	1	2	11	May ..	2	9	8			
B.	April ..	2	0	0	April ..	1	1	11	April ..	0	18	1	2	11	3
	May ..	2	15	8	May ..	1	2	6	May ..	1	13	2			
C.	April ..	2	8	9	April ..	1	3	8	April ..	1	5	1	3	6	5
	May ..	3	4	2	May ..	1	2	10	May ..	2	1	4			
D.	April ..	1	11	2	April ..	1	1	11	April ..	0	9	3	1	15	7
	May ..	2	9	8	May ..	1	3	4	May ..	1	6	4			
E.	April ..	1	8	3	April ..	1	2	8	April ..	0	5	7	1	7	0
	May ..	2	4	5	May ..	1	3	0	May ..	1	1	5			
	Total	£24	5	10	Total	£11	7	7	Total	£12	18	3	£12	18	3

Review of the Competition for the Months of April and May, 1937

[By C. F. Anderson (Chief Poultry Adviser) and A. Clifton (Competition Attendant).]

In the early part of April—the commencement of the Test—the scores were on the low side. The birds seemed to take longer to settle down this year than usual, and did not eat the full ration. Cold easterly winds which blew continuously during the early part of April, evidently had the effect of reducing the number of eggs laid. However, towards the end of April and early May, the birds began eating much better, and the laying increased accordingly. The weight of the eggs also improved rapidly during May, until at the end of the month nearly all the birds were laying a 2oz. egg. The increase in egg size could be better shown by comparison with the percentage of first grade for the months of April and May. The daily percentage of first-grade eggs for April was 78.57, and for May 96.88.

The outstanding bird at the end of May was the Light Sussex owned by Mr. H. H. Gallagher, of Pooraka, with a score of 46 first-grade eggs. Closely following this bird was a Langshan entered by Mr. T. Smallwood, with a score of 44 first-grade eggs. For the month of May, this bird laid 26 eggs in the 31 days. Other good scores were those of Master Keith Johnson's bird in the Home Project Section, with 43 first-grade eggs, including 26 for the month of May. This bird also laid 12 eggs in 12 days, every one of which was 2ozs. or over in weight.

The best score for the Soaked Grain Section was the bird owned by Mr. C. R. Thomas, of Hectorville, with a score of 43 first-grade eggs. The leading White Leghorn in the Wet Mash Section and the leading Black Orpington in the Heavy Breed Section, have each laid 42 eggs. Both these birds were closely followed by several others, with only an egg or so behind.

It is interesting to note that in the Team Section, the best score recorded was that of a Langham team entered by Mr. Smallwood, which has laid most consistently during the first two months, and has taken a good lead over all other teams entered.

The leading single score in the Soaked Grain Section is one more than in the Wet Mash. However, the scores in the whole of the Soaked Grain Section are a little disappointing.

One noticeable feature towards the end of May in the Soaked Grain Section was the unusual amount of green feed eaten by these birds. They were always particularly keen for the midday feed of green feed, and in some instances, they had not consumed the whole of the grain; this despite the fact that the Soaked Grain contains a higher percentage of green feed than the Wet Mash.

The monthly production for April was 31.1 per cent., as compared with 33.5 per cent. in the 1936-37 test, while for May it was 41.8 per cent., as compared with 49.6 per cent. for the 1936-37 test, thus showing that the laying for the first two months of the Competition was not up to the standard of the 1936-37 test.

Agricultural Bureau of South Australia

Dairying Districts Field Days

The substitution of a Field Day to replace the ordinary Conference held each year by Branches of the Agricultural Bureau whose main interests are devoted to dairying was an outstanding success. It augurs well for future gatherings of a similar nature and reflects credit on those members of the Lobethal Bureau who were responsible for its organisation.

A conservative estimate would be an attendance of 150, amongst whom representatives from the following Branches were noted:—Cherry Gardens, Mount Compass, Iron Bank, Clarendon, Longwood, Lyndoch, Jervois, Murray Bridge, Mount Pleasant, Springton, Greenock, Adelaide, Milang, and Lobethal.

The Bureau is indebted to Mr. T. Smee, of Charleston, for placing at its disposal his property on which to hold the Field Day on 13th May.

Mr. E. A. McHugh, President of the Lobethal Branch, welcomed the visitors, and Mr. P. J. Baily, member of the Advisory Board of Agriculture, congratulated Lobethal on their initiative in introducing the Field Day and thought that perhaps other Conference districts might adopt a similar fixture. He also referred to the honour that had been conferred by His Majesty the King on two members of the Advisory Board in the persons of Sir J. Wallace Sandford and Professor A. J. Perkins, O.B.E.

In the course of a most instructive day the following addresses and papers were given:—"Pasture Management," Mr. W. J. Spafford (Director of Agriculture); "Raising Export Lambs," Mr. R. C. Scott (Chief Agricultural Adviser); "The Points of a Dairy Cow" and a demonstration of dehorning by Mr. H. B. Barlow (Chief Dairy Instructor); "Fodder Conservation," Mr. R. Hill (District Agricultural Adviser); "Pig Breeding," Mr. R. Baker (Roseworthy Agricultural College); "Food Value of Milk," Mr. J. Hudd (Adelaide Bureau); and "The Growing of Maize," Mr. O. Pfieffer (Lobethal Bureau).

The Conference passed a resolution requesting the disallowance of Rule 9 of the Veterinary Surgeons Board or, failing this, that a veterinary officer be appointed to the Department of Agriculture for the purpose of giving lectures and demonstrations, and that Mr. Alderson's pictures be shown at Congress.

It was decided to accept the invitation of the Mount Compass delegates to hold the next Annual Dairying Field Day under the auspices of their Bureau.

Care of Farm Horses.

[J. E. Spencer (Baroota).]

It is not a wise plan to breed the big, heavy horse for this district, the medium, nuggety horse is preferable. This type stands up to work and conditions better and does more work on a less amount of feed. A good stable, warm in the winter and cool in the summer, goes a long way towards keeping horses in good working condition. After horses have had a long spell they should not be worked long hours for the first few days. This will prevent scalded shoulders to a great extent. Working horses are only capable of doing a certain amount of work in a day. If pushed beyond this point they not only lose condition, but get weary and do not travel so well. Horses should be spelled for three or four minutes every half hour. The horses will not only travel faster as a result of the spell, but they will be fresher when the day's work is over. To get the most work out of horses they should be fed regularly and have free access to water. In our district, where we grow hay that is quite suitable for long hay feeding, it is advisable to feed long, except in the case of the midday feed in seeding time, when a horse is required to eat its meal a little more quickly; also long hay is not suitable for old horses which have not as good a constitution as young horses. Horses fed four times a day—not too heavily—will do better than on, say, three feeds, even with the same amount of feed. The water trough should not be close to the stable, otherwise the horse will carry hay or chaff and leave it in the trough. Horses' shoulders should be brushed down and a firm fitting collar fitted to them before starting work. Mares in foal should not be turned out to spell, as they are likely to become over fat, which sometimes leads to serious trouble at foaling. Light work will not hurt mares even up to a few days before foaling. When weaning foals put them in a paddock where they can get plenty of exercise, water and feed. If foals are handled when quite young they require very little breaking in. Yearlings should be stable fed with the workers. Not only does this make them hardier, but also they will clean up the hay that is left after each meal, so that workers have fresh feed when they come in from work. Colts should commence light work at 2½ years, working half days for the first 12 months.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of May, 1937; also the average precipitation for May, and the average annual rainfall.

Station.	For May, 1937.	Av'ge. for May,	To end May, 1937.	Av'ge. Annual Rain-fall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	—	0·29	0·37	4·60
Marree	0·02	0·58	2·47	5·80
Farina	0·02	0·65	3·25	6·37
Copley	0·34	0·96	3·53	7·76
Beltana	0·42	0·92	4·24	8·39
Blinman	0·54	1·31	5·82	11·71
Hookina	0·30	1·35	5·58	10·94
Hawker	0·61	1·33	7·81	12 09
Wilson	0·67	1·20	6·56	11·65
Gordon	0·46	0·97	6·20	10·33
Quorn	0·68	1·41	8·00	13·10
Port Augusta	0·47	1·08	4·75	9·40
Bruce	0·48	0·91	7·10	9·74
Hammond	0·56	1·02	5·89	11·05
Wilmington	1·25	1·94	8·09	17·18
Willowie	0·92	1·23	5·82	12·10
Melrose	2·53	2·53	8·28	22·80
Booleroo Centre	1·06	1·56	6·73	15·14
Port Germein	1·71	1·49	5·54	12·51
Wirrabara	1·66	2·07	9·85	19·22
Appila	1·10	1·45	6·53	14·59
Cradock	0·58	1·08	6·21	10·67
Carrieton	0·67	1·22	5·10	12·11
Johnburg	0·55	1·09	7·05	10·49
Eurelia	0·80	1·28	5·94	12·66
Orroroo	0·82	1·29	6·75	13·12
Nackara	0·63	1·24	7·15	11·09
Black Rock	0·79	1·25	4·95	12·26
Oodlawirra	0·61	1·14	6·35	11·34
Peterborough	0·66	1·29	4·60	13·14
Yongala	0·96	1·40	6·38	14·37
NORTH-EAST.				
Yunta	0·41	0·94	8·02	8·44
Waukaringa	0·77	0·84	6·95	7·82
Mannahill	0·70	0·78	6·94	8·08
Cockburn	0·67	0·95	4·71	7·81
Broken Hill	0·51	0·95	4·30	9·40
LOWER NORTH.				
Port Pirie	1·51	1·54	6·17	13·18
Port Broughton	2·62	1·64	7·09	13·87
Bute	1·46	1·83	5·60	15·42
Laura	1·32	1·84	6·29	17·93
Caltowie	1·08	1·76	6·04	16·69
Jamestown	1·05	1·80	7·08	17·68
Gladstone	1·00	1·68	5·67	16·31
Crystal Brook	1·05	1·75	6·86	15·79
Georgetown	0·96	2·07	5·74	18·24
Narridy	1·19	1·81	7·01	15·74
Redhill	1·86	1·91	7·98	16·55
Spalding	1·01	2·07	6·28	18·68
Gulnare	1·25	2·13	6·73	18·51
Yacka	1·04	1·74	6·29	15·38
Koolunga	1·38	1·67	5·60	15·29
Snowtown	1·99	1·82	7·05	15·69

Station.	For May, 1937.	Av'ge. for May,	To end May, 1937.	Av'ge. Annua Rain-fall.
LOWER NORTH—*continued.*				
Brinkworth	1·62	1·82	6·97	15·72
Blyth	3·42	2·03	7·38	16·73
Clare	3·84	2·88	10·24	24·43
Mintaro	3·30	2·70	8·58	23·30
Watervale	3·62	3·06	10·29	26·69
Auburn	2·82	2·75	7·44	23·92
Hoyleton	2·45	1·97	6·13	17·25
Balaklava	2·23	1·81	7·07	15·41
Port Wakefield	1·90	1·55	5·99	12·93
Terowie	0·66	1·21	6·04	13·27
Whyte-Yarcowie	0·74	1·30	6·69	13·54
Hallett	1·09	1·65	7·52	16·39
Mount Bryan	1·59	1·76	7·38	16·76
Kooringa	1·97	1·96	7·24	17·78
Farrell's Flat	2·64	2·08	8·15	18·52
WEST OF MURRAY RANGE.				
Manoora	2·61	2·16	6·36	18·91
Saddleworth	3·11	2·22	8·35	19·56
Marrabel	3·66	2·18	8·10	19·91
Riverton	3·29	2·36	8·08	20·79
Tarlee	2·53	2·04	5·74	18·06
Stockport	2·32	1·79	5·65	17·02
Hamley Bridge	2·10	1·73	5·35	16·52
Kapunda	2·05	2·23	5·83	19·74
Freeling	1·86	1·89	4·52	17·79
Greenock	2·09	2·36	5·93	21·47
Truro	1·63	2·12	5·35	19·75
Stockwell	2·07	2·15	5·38	20·02
Nuriootpa	2·10	2·21	6·64	20·74
Angaston	1·77	2·46	7·37	22 33
Tanunda	1·63	2·45	6·43	21·97
Lyndoch	2·27	2·47	6·89	23·28
Williamstown	2·81	3·10	9·05	27·54
ADELAIDE PLAINS.				
Owen	2·63	1·65	6·92	14·78
Mallala	1·56	1·90	4·51	16·43
Roseworthy	1·25	1·86	4·13	17·43
Gawler	1·64	2·27	5·59	18·85
Two Wells	1·43	1·84	4·02	15·80
Virginia	2·28	2·05	5·99	17·22
Smithfield	2·22	2·14	7·92	17·68
Salisbury	2·43	2·20	7·23	18·55
Adelaide	3·78	2·72	8·70	21·17
Glen Osmond	4·66	3·20	10·32	25 97
Magill	4·33	3·19	10·65	25·36
MOUNT LOFTY RANGES.				
Teatree Gully	3·37	3·34	10·00	27·03
Stirling West	7·23	5·49	19·19	47·01
Uraidla	5·75	5·33	16·67	43·83
Clarendon	4·72	3·90	11·39	32·81
Happy Val'y Res.	4·07	—	9·49	—
Morphett Vale	4·03	2·66	8·26	22·62
Noarlunga	3·94	2·46	7·35	20·35
Willunga	3·47	3·41	7·39	25·96
Aldinga	3·37	2·43	7·59	20·21

RAINFALL—*continued.*

Station.	For May, 1937.	Av'ge. for May,	To end May, 1937.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	4·95	3·74	9·99	29·72
Inman Valley	4·92	—	9·96	—
Yankalilla	4·18	2·87	8·08	22·78
Mount Compass	3·80	4·32	9·43	36·25
Mount Pleasant	2·18	2·98	8·17	27·08
Birdwood	3·22	3·17	9·33	29·02
Gumeracha	3·69	3·94	11·52	33·28
Millbrook Res.	4·39	4·45	13·14	34·50
Lobethal	5·09	4·01	14·31	35·94
Woodside	4·04	3·59	11·13	32·16
Hahndorf	3·76	3·89	11·61	34·82
Nairne	2·37	3·08	8·60	28·14
Mount Barker	3·00	3·67	9·76	31·24
Echunga	3·68	4·02	11·02	33·30
Macclesfield	2·59	3·29	8·21	30·37
Meadows	4·38	4·10	11·68	36·02
Strathalbyn	2·42	2·23	6·28	19·34
MURRAY FLATS AND VALLEY.				
Meningie	2·18	2·22	5·35	18·29
Milang	1·48	1·66	4·38	14·85
Langhorne's Ck	1·78	1·58	4·53	14·93
Wellington	1·81	1·57	5·27	14·66
Tailem Bend	1·81	1·75	5·10	15·07
Murray Bridge	1·13	1·43	3·22	13·49
Callington	0·87	1·60	3·91	15·14
Mannum	1·13	1·26	4·69	11·49
Palmer	1·88	1·62	6·11	15·63
Sedan	0·73	1·28	5·75	12·01
Swan Reach	0·89	1·20	3·71	10·62
Blanchetown	0·89	1·23	3·40	10·95
Eudunda	2·29	1·83	5·07	17·13
Point Pass	2·61	2·15	6·95	16·66
Sutherlands	1·92	1·16	6·47	10·71
Morgan	0·83	1·00	4·33	9·10
Waikerie	0·63	0·90	3·29	9·59
Overland Corner	0·65	1·06	2·90	10·18
Loxton	0·60	1·21	2·62	11·34
Berri	0·64	1·11	3·39	10·03
Renmark	0·84	1·04	4·17	10·33
WEST OF SPENCER'S GULF.				
Eucla	1·10	1·25	3·37	10·08
Nullarbor	0·92	1·20	1·81	8·87
Fowler's Bay	1·74	1·70	2·45	11·93
Penong	2·08	1·69	3·04	12·28
Koonibba	2·11	1·37	3·67	12·18
Denial Bay	2·14	1·33	3·11	11·33
Ceduna	1·37	1·34	2·09	10·32
Smoky Bay	1·68	1·34	3·21	10·50
Wirrulla	1·57	1·12	6·66	10·87
Streaky Bay	1·82	1·89	3·25	14·91
Chandada	1·26	1·28	3·16	12·66
Minnipa	1·34	1·47	3·96	13·97
Kyancutta	1·28	1·16	3·04	13·45
Talia	2·02	1·85	4·74	14·76
Port Elliston	1·94	2·07	5·12	16·53
Lock	1·75	1·73	4·67	16·44
Mount Hope	3·16	—	8·92	—
Yeelanna	2·39	1·96	5·96	16·11
Cummins	2·27	2·04	6·26	17·70
Port Lincoln	2·79	2·33	5·23	19·35
Tumby	1·45	1·52	3·26	14·29
Ungarra	1·92	1·85	5·60	16·94
Port Neil	1·06	1·33	2·80	13·16

Station.	For May, 1937.	Av'ge. for May,	To end May, 1937.	Av'ge. Annual Rain-fall.
WEST OF SPENCERS GULF—*continued.*				
Arno Bay	1·04	1·29	3·62	12·82
Rudall	1·09	1·46	3·84	13·23
Cleve	1·37	1·72	3·67	14·96
Cowell	1·05	1·15	3·04	11·06
Miltalie	1·19	1·52	6·41	13·75
Mangalo	0·99	1·53	3·33	13·86
Darke's Peak	1·52	1·61	5·71	15·24
Kimba	1·05	1·22	3·60	11·84
YORKE PENINSULA.				
Wallaroo	1·71	1·84	5·22	13·97
Kadina	1·84	1·96	6·32	15·59
Moonta	1·91	1·92	6·30	15·04
Paskeville	1·77	1·87	4·94	15·44
Maitland	2·71	2·52	6·59	19·86
Ardrossan	1·93	1·66	5·56	13·96
Port Victoria	2·60	2·04	6·10	15·39
Curramulka	2·12	2·04	5·26	17·81
Minlaton	2·35	2·15	5·46	17·72
Port Vincent	1·34	1·53	3·69	14·37
Brentwood	2·84	1·85	6·50	15·61
Stansbury	2·00	2·03	4·64	16·81
Warooka	2·38	2·25	5·45	17·44
Yorketown	2·40	2·06	4·78	16·88
Edithburgh	2·11	2·00	4·34	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	5·54	3·16	9·44	24·87
Kingscote	2·62	2·49	5·47	19·27
Penneshaw	2·84	2·02	5·93	19·18
Victor Harbour	3·97	2·53	8·04	21·43
Port Elliot	3·11	2·41	7·09	19·94
Goolwa	2·74	2·16	6·61	17·84
Maggea	0·79	0·93	3·17	10·02
Copeville	1·03	1·21	3·63	11·51
Claypans	1·02	1·02	3·16	10·53
Meribah	0·67	1·36	2·74	11·11
Alawoona	1·01	1·28	3·82	10·26
Caliph	1·48	0·91	4·58	10·44
Mindarie	0·86	1·36	3·23	12·13
Sandalwood	0·84	1·66	3·74	13·60
Karoonda	1·11	1·84	3·94	14·18
Pinnaroo	0·42	1·66	2·88	14·19
Parilla	0·73	1·65	3·61	13·64
Lameroo	1·01	1·83	3·86	15·79
Parrakie	1·13	1·79	3·86	14·61
Geranium	1·37	1·96	4·77	16·39
Peake	1·36	1·85	5·58	15·95
Cooke's Plains	1·53	1·56	5·47	15·29
Coomandook	2·00	2·05	4·87	17·03
Coonalpyn	1·79	1·89	4·87	17·65
Tintinara	2·26	2·23	6·27	18·72
Keith	1·86	2·25	5·46	17·96
Bordertown	1·74	2·04	7·23	19·14
Wolseley	1·80	1·97	6·47	18·47
Frances	2·10	2·14	6·80	20·12
Naracoorte	3·46	2·43	8·36	22·65
Penola	3·66	2·90	8·62	25·94
Lucindale	3·82	2·58	9·61	23·47
Kingston	3·43	3·05	6·96	24·24
Robe	5·18	3·06	8·70	24·65
Beachport	4·07	3·18	8·78	27·07
Millicent	4·25	3·44	10·71	29·87
Kalangadoo	3·84	3·63	9·98	32·05
Mount Gambier	2·98	3·40	7·43	30·34

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East, 21st May, addresses, G. Thompson and W. L. Laslett. Appila-Yarrowie, 7th May, "Pig Killing," C. W. Wurst. Arthurton, 15th April, "Soil Erosion," S. Pontifex and R. Prouse. Balumbah, 5th May, "Labour-saving Devices". Beetaloo Valley, 19th April, "Seeding Preparations," E. L. Orchard; 17th May, "Silage," J. S. Shaughnessy. Berri, 10th May, "Drainage," H. T. Garde. Blackheath, 29th April, "Slaughtering Livestock," S. G. Mudge. Black Springs, 25th May, Question Box. Blewitt Springs, 25th May, "Cattle Diseases," G. Connor, M.P. Blyth, 30th April, Papers. Booleroo Centre, 24th April, Report of Milling Tests. Boor's Plains, 6th May, "Take-all and Foot-rot" S. G. Chynoweth. Brimpton Lake, 15th May, "Clearing a New Block," B. Rodgers. Butler, 10th May, "Wimmera Rye Grass—its effect on Wheat Growing," D. C. Stewart. Coomandook, 30th April, address, W. J. Spafford; 25th May, address, R. L. Griffiths. Coonalpyn, 19th May, "Fallowing," S. Todd. Frayville, 22nd April, Election of Officers. Glencoe East, 4th May, "Pastures," E. S. Alcock. Goode, 28th April, Question Box. Greenock, 19th April, address, L. Plush. Hartley 19th May, "Mineral Deficiency," E. Yeates, "Vegetable Growing," L. Brook. Hilltown, 4th May, "Seeding Preparations," A. H. Wedding. Karte 28th April, Discussion. Kelly, 1st May, "Fodder Grasses," C. H. R. Martin. Keyneton, 11th May, Inaugural Meeting. Kilkerran, 26th April, "Care of Livestock," G. Heinrich. Koonunga, 21st April, "Veterinary Lodges," M. Emsley; 13th May, "Wool-classing," C. A. Goddard. Kulkawirra, 18th May, Discussion. Kyancutta, 4th May, Question Box. Laura Bay, 12th January, Papers; 9th February, Papers; 9th March, Papers; 13th April, Discussion. Lyndoch, 25th May, address, "Currant Vines —5 years' Experiments," J. B. Harris. McLaren Flat, 29th April, Travel Talk, F. B. Wilson. Monarto South, 15th May, address, Dr. C. V. Hallett. Mt. Hope, 18th May, "New Zealand Tour," A. J. Vigar. Mudamuckla, 23rd April, Paper. Murraminga, 3rd April, "Sheep," Frank Roberts; 30th April, "Pastures," W. Brownrigg. Nantawarra, 30th April, Discussion. Narridy, 1st May, "Farm Finance," M. Clark. Nelshaby, 20th May, "Better Wheat Marketing," R. P. Noble. Nunjikompita, 8th May, Annual Meeting. O'Loughlin, 20th April, Crop Competition Report. Parilla Well, 18th May, Discussion, Oat Crop Competition. Paskeville, 25th May, Paper from Journal. Parrakie 23rd April, Crop Reports. Penola, 14th May, "Pastures," E. S. Alcock. Penwortham, 19th May, address O. Bowden. Poochera, 4th May, Discussion. Pt. Elliot, 22nd May, "Fodder Conservation," F. C. Keen. Pygery, 25th May, Discussion, Trees. Quorn, 1st May, Re-organisation of Branch. Red Hill, 5th April, address, R. C. Scott; 13th May, "Sheep," H. J. Crouch. Riverton, 17th May, "New Wheat Varieties," O. Bowden. Robe, 16th April, "Coast Disease," R. Dawson. 22nd May, addresses S. Shepherd and C. A. Goddard, "Care of Horses' Feet," J. J. Elliot. Roberts and Verran, 21st April, "Maintaining Sheep from Autumn to Spring," F. Masters. Rosedale, 29th April, "New Zealand," R. C. Scott. Snowtown, 14th May, Question Box. South Kilkerran, 3rd May, "New Zealand," R. C. Scott. Springton, 5th May, "Pasture Improvement," R. Hill. Tantanoola, 1st May, "Dairy Herd Management," W. H. Downes. Tarlee, 6th May, address, L. Molineux. Taragoro, 20th May, Discussion. Truro, 17th May, "Seeding," E. L. Orchard. Upper Wakefield, 6th May, address, W. J. Spafford. Whitwarta, 5th April, address; 3rd May, "Farm Engines," B. Moldenhauer. Wilmington, 9th May, "Mallee Scrub Clearing," V. P. Daly. Yadnarie, 27th April, Discussion. Yundi, 28th April, "Curing Ham," W. Hunt, "Farm Buildings," A. Cox. Yurgo, 26th April, Annual Meeting.

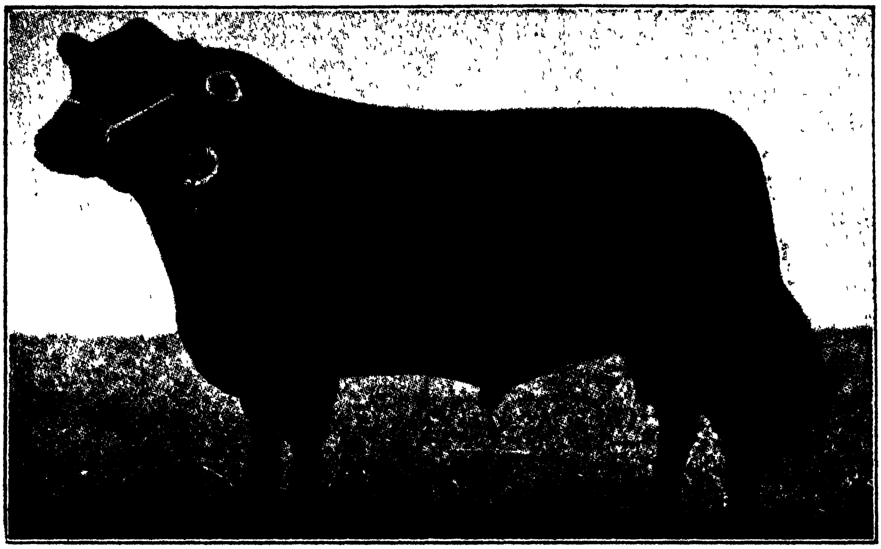
Breeding of Beef Cattle for Baby Beef and Vealers.

[G. DEPLEDGE (Port Elliot.)]

With top dressing and better pastures there is a big surplus of feed in the spring time; and where sheep only are kept this grows rank and sheep leave it, keeping to the shorter pasture. The long feed then goes to waste. To get the best results from our pastures we are told that we should keep them short, and to do this we must either use the mower or put on cattle. Cattle are the best proposition with sheep.

As some people do not go in for dairying on a large scale, it is my intention to deal more with Baby Beef and vealers. Since the lamb, mutton and beef export trade has been on a quota to Great Britain, Australia has been exporting beef which previously was coming from South America to supply the British markets. South America is now trying hard to recapture more trade by supplying more tender and juicy beef, which they call Baby Beef, and if we are to keep up our quotas, we must do likewise and rear the younger beef which the public require. You say, "How are we going to compete against the Argentine?" I say, "By growing young beef as they are doing." To do this we must get better beef cattle. We must not breed entirely from dairy cattle and expect to rear all the surplus calves for vealers and beef.

One only has to go to the markets to see the variety of cattle that come forward at this time of the year to be sold for beef or smallgoods, and very often the owner gets very little for them.



The Aberdeen Angus, a good beef breed.

Where people are engaged mainly in dairying, I would suggest that one person buy a beef breed bull and hire him to his neighbours for service on certain of his dairy cows, as a dairyman does not require all his calves to keep up his milking herd, and a lot of them are sold or killed. It would well repay anyone to do this, either fattening the calves for vealers or selling them to graziers to rear for Baby Beef, as they soon fatten and bring good money. There is good inquiry for vealers at all times, and more so since exporters have started on boneless veal.

The main thing in getting good calves is to feed them well. If a cow is kept in good condition while carrying her calf, the calf will generally do well; and even when fed on skim milk with a little concentrates, it will still do well. If a beast receives a check while young, in most cases it remains a runt for the rest of its life. The little extra feed and trouble are well repaid by the returns, either for dairying or beef.

Most of our beef export comes from the Northern Territory, Queensland, New South Wales and Western Australia, and when we consider the travelling these cattle do before they reach the markets or freezers, can we wonder that our reputation for beef has a long way to go before we reach the standard of the Argentine?

We must either breed or fatten more beef cattle in our heavier rainfall districts or else hold the station cattle from the interior on pastures until they recover from their long journeys, if we are to keep our export quotas against the Argentine and New Zealand.

South Africa has now come into the Home market in competition also. The only way we can compete is to improve our standard of beef by breeding better cattle for beef and killing them young. It is quite possible to breed beasts that will dress 700lbs. at two years if one has a good foundation to start on.

A suitable breed is the Aberdeen Angus or Black Poll, which though a little timid amongst the yearlings, soon becomes quiet if hand fed. Because they are polled they are quite docile while being hand fed. Other beef breeds are Shorthorns, Hereford, Devons and Red Polls, all of which are good early-maturing beef cattle and suitable for breeding and fattening good vealers or Baby Beef. We have made great progress with our fat lamb export trade, and our products compare more than favourably with any other country exporting. I think that if we can do the same with our cattle for export, there will be very little room for complaint from overseas.

The killings of stock for export compiled by Commonwealth Department of Commerce for November, 1936, one of the peak months for export in all States are as follows:—

	Sheep.	Lambs.	Cattle.	Calves.
South Australia	216	110,567	502	329
Victoria	60,232	971,137	4,626	14,882
N.S. Wales ..	186,379	364,553	20,667	18,760
Queensland ..	40,411	6,784	13,342	34,120
Western Aus. .	—	**51,103**	—	—

These figures go to show what other States are doing in the peak period of the year. Why cannot we do the same?

Sheep on a West Coast Wheat Farm

[G. Wheal (Poochera).]

Secure a line of cast-for-age station ewes in lamb, which would be able to produce lambs for another two or three years. The type should be plain full-bodied Merinos, carrying a fairly strong even covering of wool. The reason for suggesting station ewes (aged) is that they should be all proven mothers and sheep that have been profitable and well worth keeping for that length of time. The ram with which these ewes are to be mated should be large and plain bodied, but having good neck folds, with fairly wide-set, strong loins and a bold, active appearance, with wool, if anything, slightly stronger than that of the ewes, as there is always a tendency in light country for the wool to become finer after a year or so. Unfortunately neither rams nor ewes are likely to throw true to type, and constantly culling out of badly formed sheep is necessary to maintain uniformity of type in the flock.

Feed.

To maintain this flock and obtain the best results from it there are two most essential items, viz., good feed and good water. Farmers differ considerably as to what the above are. The type of sheep referred to like short, sweet feed in preference to long, rank stubble or grass. In some districts horses and cattle remain fat on long feed, while sheep are poor in condition. While the main growth of feed takes place endeavour to prevent rankness by using big stock, and utilise it for sheep afterwards. Also, when possible, change your sheep from paddock to paddock fairly often. Although feed in a paddock may make very little growth while being spelled, its grazing values are very much improved for the sheep.

Water, the second item, is most important. It is an old saying, "Give a Merino plenty of water through the summer and it won't need grass." Now good water does not mean providing a trough 6ft. long for 300 or 400 sheep. There should be plenty of room at the trough and a ball tap supply, so that the trough is always full. The trough should be situated in the paddock where the sheep are grazing and close to shade timber.

COMMENCE SHEARING.

This operation should take place once a year at any time between 1st August and 30th September; not earlier, as the chance of striking wet, cold weather is so much greater, and not later, because the barley grass seeds usually start to scatter from about the first week in October. If possible the shearing shed should be a separate building (free from chaff, &c.) and erected with the view of convenience of handling the sheep. A separate small counting yard to every shearer's stand is useful for keeping tallies and quite often does away with arguments on that point. Avoid, if possible, keeping sheep in the yard more than one night, as hollow sheep are more apt to get cut whilst being shorn; also, never turn freshly shorn sheep out in the rain.

DIPPING.

Fortunately for the farmer this is being enforced. Fortunately, because the benefits derived from this procedure are manifold. In fact, with the blowfly trouble and danger of infestation of lice, dipping is essential if one wants to keep one's flock in anything like healthy condition.

A fortnight after shearing is the best time to dip sheep. They will have enough wool then to hold the dip solution, thus rendering the dip more effective. It is also advisable in hot weather to yard the sheep over night before dipping, to be able to get the dipping done before the heat of the following day.

MATING RAMS.

The actual time of mating is a matter of choice. Some farmers prefer having their ewes lamb as early as March, others as late as September. In either case, the welfare of the lamb depends on the season. In the first place it is of no use to expect a good percentage of lambs from one's ewes if the ram is allowed to run with the flock from one year's end to the other. Whenever their seasonal work is done separate the rams from the ewes and keep them in a small paddock of their own. Keep them in good condition by giving them plenty of water and grass before mating again. The percentage of rams joined with ewes is another important factor. If rams are young and strong, 2 per cent. should be sufficient; if they are low in condition and old, 3 per cent. is necessary.

CRUTCHING.

Crutching is a phase in the care of the flock which has been either overlooked or considered not worth doing. The benefit would be instantly recognised if once carried out. The main reason for crutching is to assist in checking blowfly strike in the flock; this is quite evident if carried out before the green feed affects the droppings of the sheep.

Another saving which this operation brings is that if done before the breech wool becomes stained, the value obtained for it would be double its value at shearing time, when it would be nothing but "dags."

LAMBING.

During this period a farmer must be prepared to devote two or three hours daily to riding around his ewes, early at morning and last thing at night, if he wants a good lambing percentage and low mortality rate. Maiden ewes would need assistance in some shape or form. When going around the flock it is as well to leave the dog at home. A dog tends to frighten the ewes and thus the trip would do more harm than good. Always take a pair of shears and a bottle of phenyle. It is surprising how quickly ewes become fly struck. Crows and foxes will take a large toll of the lambs dropped if poison of some sort is not laid. If the lamb is strong and the ewe is on her feet the chances of foxes interfering are not so great.

MARKING LAMBS.

This should be done about a fortnight after the last lamb is dropped. If lambs are marked while there is still good green feed in the paddocks and before the hot weather sets in, there will be less mortality. There are two troubles to guard against at marking time—tetanus and flies. Tetanus, caused through dirty yards and operating tools, careless dropping of marked lambs, or flies, can be avoided if some strong disinfectant is used, or if blowfly mixture is applied. When the ewes are released after marking don't let them race away to the paddock, but hold them out from the yard until satisfied that all the lambs are mothered

GENERAL REMARKS.

Always remember that it is more profitable to feed a young sheep than an old one. When the old ewes are getting light in condition or wool, get rid of them even if it means taking a shilling or two less for them.

When baling up the year's wool clip, make the bales and marks thereon as neat and attractive as possible. The wool firms assure you that it pays.

Never yard sheep more than is necessary.

Always have crushed salt available near the water supply in the summer.

Finally, to get the best results from sheep on a wheat farm, sheep must always be first and wheat second.

Bee Keeping.

[EDGAR SCHOELL (Lobethal).]

THE LIFE OF THE BEE.

Like all insects the honey bee passes through four stages during its lifetime: the egg, the larva, the pupa or crysalis, and the imago condition. All the eggs are laid by the queen and are about one-twelfth of an inch in length. These are deposited against and adhere to the bottom of the cells of the comb. In the course of three days a tiny worm or grub has been developed and makes its way out of its delicate shell. Fed by the nurse bees first on a jelly-like substance produced by certain glands of the nurses, and later on a mixture of pollen and honey, it rapidly grows. Its food supply is made strictly according to its wants, and by the time the larva is ready for its next change not a drop of food is left. The grub now spins for itself a cocoon in its cell, which is then covered with a lid made of wax and a sticky substance called propolis. This is done by the other bees. At length maturity is reached. In the case of queen bees, 16 days suffice for complete transformation from the egg to the full-grown insect. Drones require 24 days and workers from 19 to 22 days according to the weather. The young bee soon starts its earliest duties, the tending of the brood cells, the feeding of the larvae and the varying offices so recently performed for itself by its slightly older sisters. Then as strength increases flying is attempted, and the young bee takes notice of the locality of its home before going forth in search of stores for the hive.

Each complete swarm of bees consists of three classes: the queen, who is the parent of all the offspring; the drones or males; and the workers, which are really undeveloped females.

THE QUEEN.

A special cell is built by the bees in which to rear the queen. The cell is constructed facing downwards, usually at or near the bottom edge of the comb. Although the egg laid in this cell is the same as that laid in the worker cells, this egg produces a queen because the larva or grub is fed on a special food known as "royal jelly," while the larva in the worker cell is fed on a coarser mixture known as "bee bread." Thus a change takes place, and 16 days after the egg was laid a fine, young queen or princess will arrive. Her majesty is quite easily distinguishable from the other bees, in that she has a longer body and comparatively short wings.

The mother queen may now slay this young rival queen and continue to rule the hive, or she may leave the hive with a large number of other bees and seek a home elsewhere. Hence the swarms we sometimes see flying overhead or hanging about in clusters.

At home the young queen will reign supreme after she has been fertilised and begins to lay eggs, usually after she is nine days old. Then her sole duty seems to be egg-laying. The ordinary rate of laying in the spring and early summer varies from 600 to 800 eggs a day, but under special circumstances she will lay as many as 2,000 eggs in 24 hours. An average queen may live four years, but she is only mated once.

THE DRONE.

The drone or male bee is shorter than the queen, but larger and more robust than the workers. His only work is to fertilise a young queen and he dies in doing so. Should he, however, wish to go out and gather honey, he would soon find himself at a disadvantage, since he has no suitable tongue for collecting honey from the blossoms. Neither has he a receptacle in which to carry home the sweet nectar. The drones live on the stores in the hive, and as the honey season ends, they will be disabled and dragged out of the hive to perish, as they have no sting with which to defend themselves.

WORKERS.

The worker bees are by far the most numerous, but in size they are smaller than the queens or the drones. Although they are females, they by no means can be called the weaker sex, for they do all the work that is to be done. Probably the worker bee's most important labour is to gather honey, and it has been proved that they will go as far as five miles to favourite blooms. Their sac for carrying the honey resembles the crop in birds. In this sac some slight, but important, chemical change seems to take place before the honey is deposited in the cells of the honeycomb. In tests carried out by an American agricultural college it was found that on an average it takes 20,000 bee-trips or loads to make 1lb. of honey.

Another important labour of the worker bees is wax making. This is a natural process. The wax is made from honey absorbed by the system of the bee and exudes in a liquid form, thickening on reaching the air and drying in flakes like fish scales on the underside of the bee. The bees then take these and with most astonishing skill the honeycomb is built.

Besides honey gathering the bees also collect pollen. This they do while on the wing, without settling on the flowers, gathering the pollen with their tongues. Then when they have collected quite a lump they clasp it in their front legs, pass it on to the middle set of legs (for a bee has six legs), thence into the hairy cavities provided for the purpose on the two middle joints of their hind legs. Then when the bee returns to the hive it will proceed to cells containing pollen, and having found a suitable cell will insert its hind legs and by a clever movement detach the little balls of pollen. The pollen is then rammed into a compact mass by another bee using its head. In gathering pollen the bees perform a most important work—that of pollenising the flowers, thus assuring an abundance of fruit and seeds.

During the honey season the worker bee lives only about six weeks, while in the slack season in the autumn and winter she will live six or seven months.

THE STING.

The sting is truly a mighty weapon. It consists of a barbed point with muscles and a little bag of poison attached. This is the bee's means of defence. With it they protect their stores against robber bees and other pests. When a bee stings it always has a reason for doing so. It may be that someone is taking its honey, that the bee itself has been harmed, or that the swarm to which it belongs is queenless.

HONEY AS A FOOD.

For thousands of years mankind has realised the value of honey. We read of it in the Scriptures in the time of Jacob, and again in the land of Canaan pictured as "a land flowing with milk and honey." In the ancient history of China, Egypt and the Greeks we learn of the value of honey and of the thrifty habits of the bees. For hundreds of years bees have been kept to supply honey and wax, but it is only since the invention of the movable comb hive—just a hundred years ago— that beekeeping as an occupation has progressed to such an extent that honey can be used as a food and not merely by a minority as a medicine.

THE HIVE.

In South Australia the 8-frame or 10-frame standard hive is most used, on top of which can be placed another bottomless box (or super as it is called) as the bees require more room for storing the honey.

The wooden frames that are hung in the hive consist of four pieces of wood nailed together. Frames and hives are of a standard size—a feature that has made commercial beekeeping possible. The hives should always be kept painted and in good condition, as they are subject to all the extremes of climate and a rotten hive will not keep the bees in when shifting becomes necessary. Aluminium paint has lately been used on hives with advantage, and it is claimed to last longer and be more fire resisting than ordinary paint, but where aluminium paint is used it is necessary to paint the hive first with a good flat paint.

The Italian bee is the general favourite. It is more prolific, will work earlier and later, gather more honey and live longer than the ordinary bush bee. Practical beekeepers pay large sums of money for good tested queens.

A beekeeper must watch the honey supply in his own district and should have a fair knowledge of botany.

MOVING THE HIVES.

The honey supply in other districts should be watched, also the number of swarms kept, as it is necessary to avoid overstocking a district with bees. Since the coming of the motor truck moving bees has become a simple matter, and bees can be moved long distances in one trip. Moving should never be attempted in warm weather, for then the wax of which the comb is made is liable to collapse and the bees may suffocate. Moving is best done at night when the air is cooler. If opened up in the early morning the bees mark their hives better and know which hive to return to. The hives should be set about 5ft. apart in the rows, and the rows 10ft. apart. This has been proved the best for working amongst the bees. Each box should be placed so that it faces the north-east and the front of the box should be slightly lower than the rear to prevent the water running in.

FEEDING.

Feeding the bees is important should there be no honey within moving distance. A lower grade of honey than that required for market is quite good for feeding, provided it is free from disease. The honey should be diluted with hot water by adding about one pint of water to 4lbs. of honey and fed in wooden troughs made for the purpose. Feeding bees is best done at night.

DISEASES.

Bees, like most other creatures, have their plagues and diseases. Of these, the worst is Foul-brood, a disease that will wipe out a whole district of hundreds of swarms if not checked. Hence the registration fee placed on each swarm of bees kept in this State to provide a Foul-brood Inspector to inspect the hives and to advise on the eradication of the disease. The symptoms of this disease are: (*a*) a bad smell when the hive is opened, and (*b*) the brood or bees in the larva stage are stringy and rotten. Foul-brood will not harm the older bees, but will prevent young stock maturing as the older bees die.

Another disease among bees is dysentery. This occurs only in cold, wet weather and is caused by moisture in the hive, either through ineffective ventilation or a supply of honey that will not ripen.

The enemies of the bees include birds such as the marten swallow; moths that will eat the wax from a weak swarm; mice that will get in and eat the wax if the outlet for the bees is too big; also ants, spiders, and last but by no means least the robber bees. These are bees that will carry the honey away from a swarm that is queenless or too weak to protect its stores.

Before approaching a swarm of bees it is necessary to put on some protection. This is best done by placing a veil of mosquito netting over the head, and if the bees are very savage, one should wear gloves made of very strong material. A smoker should also be ready. Putting old bags into the smoker has been proved the most effective and the safest. Smoke subdues these insects to such an extent that many apiarists work the bees without even a veil to protect the face.

Swarming occurs mostly during October and November. The swarms usually settle near the parent hive within a chain or two, and it is necessary for a beekeeper to have plenty of hives and frames on hand during this season. It is advisable to place comb containing brood in the new box before shaking or brushing the bees from the stump or limb where they have settled, because they will then take to the new home more readily.

Honey-taking by the old method of straining through a cheese cloth has practically ceased with the invention of movable frames and honey extractors. Hand extractors are made of a two and four-frame capacity, and the power extractors are capable of extracting 40 frames in one operation. The cappings on the cells, which keep the honey from running out, must first be removed with hot knives before the frames are placed in the extractor, which turns the frames at a high speed and throws out the honey by centrifugal force against the sides of the machine. The honey is then tapped and poured into tanks to ripen before it is tinned ready for market.

Different trees and shrubs produce honey different in taste and colour, and an experienced apiarist can class and grade all the honey in his district.

Bee Keeping.

[H. G. Pym (Blackheath).]

A colony of bees consists of from 25,000 to 75,000 bees, the queen bee being the mother of the colony and it can be seen how important it is to have queens none other than the best, the whole burden lying on the queen to maintain the strength of the colony. It has been found that a good queen at the height of the season will lay up to 2,000 eggs a day. The life of a queen varies from two to three years, but she may live five or six years. As a rule, when over two years they are not worth much. Some consider it advisable to re-queen every year. The worker bee is not long lived, usually not over three months, and at the height of the honey flow they do not live more than six to eight weeks. To get the best results bees should not be more than half a mile or so from their pasture fields, at the most a mile and a half. It has been known where no nectar is to be had closer that they will travel three to five miles. To keep a swarm of bees at its best it is important to have good comb. This can best be got by starting every frame off with a full sheet of foundation comb, so that the bees will build worker-bee comb. This safeguards the swarm against rearing too many drones, as all eggs laid by the queen in worker-bee comb will produce worker bees and thus maintain the strength of the honey gatherers. The marvellous structure of the comb compels our admiration. The walls of its cells are so thin that from 3,000 to 4,000 of them must be laid one upon another to make an inch in thickness, and yet it is capable of holding an enormous weight of honey.

Honey varies in quality and flavour. Some people think that a strong-flavoured honey is the fault of the beefarmer and that all honey should be of a good even quality. The quality and flavour of honey are governed principally by the blossom from which the bees gather the nectar. Bees are the medium through which the nectar is changed into honey, but they cannot convert a strong-flavoured honey into a mild, good-flavoured article. One may get honey almost water white, yellow, or even down to a dark-red in colour, and all may be pure extracted honeys, with flavour varying as much as colour. If one has bees working on pasture which is producing a first quality article, it is the fault of the apiarist if, when extracted, it is other than first grade. A really first grade honey can be spoiled by extracting too soon or whilst it is in an immature condition.

Bees will not seal over honey that is not ripe, and not until most of the cells are capped over is it in a fit condition to extract a first quality article. If taken as mentioned above, one should have a heavy-bodied, good-flavoured honey. If taken too soon one has a good chance of it fermenting and turning sour. The health of the present generation would be greatly benefited if more honey were used. Honey is a natural sweet. The excessive use of sugar brings in its train a long list of ills.

The apiarist, like most other occupations, has been fairly hard hit; the price of honey has not been on a very sound basis for a good number of years. The necessity of moving bees from one locality to another to keep them alive is rather expensive, and with timber becoming thinned out more every year the lot of the beefarmer is not all that could be desired.

Hay and Silage.

[A. Davis (Ironbank).]

Hay and silage-making are the safest methods of conserving fodder. Whether it be in high or low rainfall area, there is always a risk of insufficient rain falling to give much growth. On the other hand, there are years when the growth of crops is such that 1,000 tons of fodder could easily and profitably be put down for silage, which would feed a great number of stock in dry seasons.

In high rainfall areas there is always a chance of abnormally wet seasons occurring, when growth is retarded through too much rain and cold. This causes stock to suffer through insufficient feed to maintain bodily warmth, which means that condition is lost and death occurs in some cases. Besides guarding against the chance of winter scarcity, it is possible to carry many more stock if fodder is conserved, which means greater returns and profits.

"Silage Making."

When fodder is to be conserved as either hay or silage, select the cleanest land, be sure to have all stones, sticks and wire picked up, and see that all stumps or trees are taken out where practicable, so that work can proceed without delay or fear of breakage.

The land should be as flat as possible; the soil there is usually of a strong nature and provides the heaviest crops. So that the best possible crop can be assured, one should endeavour to establish a mixture of the most prolific grasses which, when supered, will give the maximum yield. Sow super late in the autumn and feed off well during winter months, but by no means endeavour to eat it out. During the latter part of August the paddocks should be supered again and then shut up until fodder is cut. It is possible to cut silage and hay from the same paddock, but in this case the paddock should not be grazed at all. This can be practised where only a limited area is available from which to cut fodder.

Save as much silage as possible, as it can be gathered and stacked before the rush of hay-making. Also, weather is not so much to be considered, because silage can be gathered even if light rain is falling. After silage has been cut, there is quite an abundance of second growth which makes good grazing. When silage is to be stacked, choose a site where drainage is available as quite an amount of juice will come away after stacking.

Do not expect to start and finish in a few hours; it takes quite an amount of labour to lift green fodder on to the stack. Bring the stack to about 16ft. and then weight it. In about 48 hours bring it up to that height again. Continue this until all available fodder has been used. Then weight the stack to allow it to settle, again making sure that drainage is good, as lack of drainage will mean loss of work and feed. A round stack is less subject to wind driving in and causing wastage. When practicable, I prefer the pit, as there is a minimum of waste and filling is easy. Although all the silage has to be lifted again, it is only done in smaller quantities and at regular intervals.

When haymaking, the same care should be taken in selecting the paddock, and hay should be cut on the green side and not allowed to lie for more than one day before cocking. Hay cut with plenty of colour is more palatable to stock and has a higher food value. Carting should be done as soon as possible after cutting is finished. Do not make the stack too wide. Build it as high as possible; by doing so, waste from weather will be minimised and the hay will cure better in a heavy stack.

We are in a country lacking in minerals and one of the main things required by stock is salt. By putting a liberal salt dressing in the hay, one not only feeds salt to stock, but also preserves the hay if it is a little damp when carting is done.

While hay is a valuable fodder, silage can be collected more easily, has much more food value, and is safer to hold. It can be stored in a smaller space, and will keep out rain and last for many years without fear of being attacked by mice. In case of fire, it will not burn so readily on account of its damp nature, and its compactness will not allow fire to penetrate. Cows do well and milk well when fed on silage.

I do not wish to give the impression that hay should not be cut. I strongly advocate cutting every available bit of fodder, but more can be conserved if green fodder is put down for silage. The balance, when it begins to dry, can be put in stack for hay. Where horses are kept, it is necessary to have some hay; silage is not a suitable food for horses. Maize, Sudan grass, millet make excellent silage if chaffed.

Is Wimmera Rye Grass Detrimental to Wheat Growing in the Butler District?

[D. C. Stewart (Butler).]

There are men who are afraid that Wimmera rye grass will develop into a bad cultivation weed, difficult to eliminate from fallow, and thereby spoil the wheat crop. This undoubtedly would be the case if proper farming methods were not adopted, but we have other weeds which are just as bad, if not worse, to eliminate from our fallows, and which have practically no feeding value, *e.g.*, the dandelion. Wimmera rye grass will not be half as troublesome to keep off fallow as is the dandelion.

If land to be fallowed is heavily grazed in the late spring and early summer to check the formation of ears, farmers will have no difficulty in keeping the fallow clean nor will there be any loss in the following wheat crop. Wimmera rye grass is going to increase instead of decrease the production of wheat in Butler.

Firstly, we will be able to carry more sheep, and the more sheep a farm can carry the quicker we are going to pack the soil. Not only do sheep pack the soil, but they enable the farmer to subdivide his farm into small paddocks and thereby to adopt better farming methods. To try and create as much interest as possible in dealing with this subject, I wrote to the Chief Agricultural Adviser, who replied:—

"In my opinion Wimmera rye grass is the most valuable grass variety for South Australian conditions. Because it relies upon its free seeding habits, it must be handled correctly if clean cereal crops are to be grown. Where the fodder has been criticised for infesting cropping land is on farms that are not fully stocked or fenced, so that the plants are permitted to seed freely in the year prior to fallowing.

"Under such circumstances, many seeds carry through the period of fallow and grow up with the succeeding crop, but if Wimmera rye grass is grazed heavily in late spring or early summer so as to check the formation of ears and then followed up by a good fallow, only a limited number will survive and grow up with the crop. The plants would have no detrimental effect and, as a matter of fact, would improve the stubble grazing. There are plenty of wheatgrowers in this State who have had Wimmera rye grass on their farms for many years and do not regard it as at all objectionable so far as wheat growing is concerned. On the other hand, in light land particularly, it can thin out a wheat crop if precautions to prevent seeding are not taken; but with proper management there is much that can be said in favour of Wimmera rye grass.

"It is essential that only seed of the best strain should be utilised. There are some poor types that are hard and wiry and not eaten readily by stock. Therefore, when purchasing seed, only certified seed or MacDougall strain should be secured. I am certain that the planting of Wimmera rye grass will have no injurious effect upon wheat growing in the hundred of Butler and, in fact, it can be confidently recommended.''

(Extracts from the Bulletin No. 302, ''Increasing the Stock Carrying Capacity of Mallee Farms,'' pages 25 and 26, were also read.)

Members have nothing to fear from sowing Wimmera rye grass on their farms. It is easily the best grass for Mallee farms. It will grow wherever barley grass grows, provides a greater bulk of feed than other grasses, is palatable to stock at all stages, and can be established cheaply and easily.

Erosion of our Soils.

The April meeting of the Arthurton Branch was attended by members of the Paskeville and Boor's Plains Branches. Messrs. J. Prouse and S. Pontifex of the Paskeville Branch read papers dealing with Soil Erosion, extracts from which appear below:—

[Part I.—J. PROUSE (Paskeville).]

Wind erosion or drift is by no means new. Soils of a loose, sandy nature, and more particularly sandhills as we know them, have been known to drift as soon as they have been denuded of their natural growth of bush or vegetation, and to my knowledge this dates back a good many years. But the trouble is extending, and is no longer confined to these soils alone. Some of our heavier soils, in fact some of our best land, is showing signs of drift. This fact is causing grave concern, not only to agriculturists and pastoralists, but to our State and Commonwealth Governments. Nor is it confined only to South Australia, for practically every country in the world is confronted with the same problem.

Much has been written, but very little accomplished as a means to remedy the trouble. It has often fallen to the man on the land to work out his own salvation, for there is no set rule or guidance in the course of farming and climatic conditions often upset his calculations. If this question of soil erosion were brought more forcibly under notice of members of the Agricultural Bureaux with a view to discussion, some valuable suggestions or information might be obtained, either as a means of combating it, or its prevention. The matter is of vital importance to the man on the land, for every farmer knows what it must mean to him if the fertility of his soil is ruined, and everyone else (not forgetting the housewife) knows what it means to have it deposited in the home in dust form.

Soil erosion may be classified under three types. First, the loose, sandy soils or sand dunes which, because of their nature, are always subject to drift with strong winds. Secondly, damage is caused by water erosion, when sometimes wide strips of valuable top soil are washed away by heavy rains. Then there is damage by wind to our heavier soils.

Of the first it may be said that we, on the northern part of Yorke Peninsula, are not so deeply concerned, as it does not affect us to any great extent. But knowing the vast area this class of land covers, even in South Australia, we are concerned to some degree, for we realise what it means to others and to our State as a whole.

We are not often or very seriously affected with water erosion, although we are conversant of the fact that where this occurs the fertility of the soil is lost. It has been estimated that, in the evolution of the soil, 1in. depth of surface takes from 250 to 1,000 years to develop.

Our greatest anxiety lies where wind erosion is causing damage to our heavier type of soil. It is apparent to us all that the evil is becoming more pronounced, and it is high time we took steps for its prevention as far as possible. It may be of interest to know that in the United States a special Branch of the Agricultural Department, called the Soil Conservation Service, has been formed to investigate these problems and to publish a monthly journal dealing with such matters. We are aware of the fact that clearing the land of its natural vegetation and breaking up the soil aid erosion, but as this is essential to agriculture there is no alternative unless we revert to the days of the aborigines. We believe, too, that the position has been aggravated by insufficient winter rains to consolidate the soil, but as this is beyond our control we must look for other means of assistance.

Experience and observation of some of our members reveal the fact that some of our worst drifts occur on fallow land, following a barley crop that has previously borne a wheat crop. Especially is this noticeable where straw or other matter is sufficient to drag in the harrows, thus making an even surface, which provides an easy get-away for the fine tilth that is brought to the surface after heavy summer rains. Some are of opinion that we make too much use of the harrows because it saves time and is more economical, when perhaps better results may be obtained by the use of a rigid-tyne cultivator.

The burning of stubble, thus depriving the soil of organic matter and a binding element, is gradually losing favour, though force of circumstances this year will prevent this being done on a great many holdings. It is also claimed that intense culture is inimical to best results, inasmuch that the soil becomes too fine and does not get time to consolidate. In this the use of the tractor has been brought into the question. With a tractor so much more can be accomplished, and as there is not the necessity to provide feed, except perhaps for a handful of ration sheep, practically the whole farm is continually under cultivation and does not get a spell. Overstocking is another factor encouraging drift, for in addition to the land being kept very bare, stock have to rummage for food, which makes the land very fine, especially in the dry period. Some are wondering if the constant use of fertilisers, which contain a certain amount of acid, has a tendency towards breaking down the soil to a finer degree, thus making it more susceptible to drift.

[Part II.—S. Pontifex (Paskeville).]

Soils of a Loose, Sandy Nature, or Sand Dunes.

Once this land is denuded of its natural growth and broken up, it is prone to drift, especially after a few years of cultivation. It is composed of particles of even size which do not easily bind together and, being generally low in humus, there is very little (if any) binding element in it, particularly where there is a low rainfall. Farmers in these areas would do much better if they refrained from attempting cereal growing in this class of country and turned their attention more to grazing. Through research and experiments quite a number of grasses have been discovered that may with profit be grown on these holdings, and the Department of Agriculture would be only too pleased to advise settlers of the best grass to grow for their respective districts. It has recently come under notice that farmers in sandy localities around Bute, Willamulka, and Mundoora have adopted this policy, and some have been successful in establishing quite a fine pasture. Given a nominal rainfall with a little top dressing when necessary, this is excellent for the raising of fat lambs, and drift is eliminated.

Water Erosion.

The greatest damage is usually done on fallow where the ground is sloping and has been worked to a fine tilth. Summer rains are generally accompanied by thunderstorms. The earth has not time to absorb the rain and it has to flow to the lower level, taking the top soil with it. Where a channel is washed out to some depth, it is as well to leave it and work on either side, but when it is only the depth of the working, we have to break this up again; when Nature at once begins to work to restore its lost constituent, and a little cross working tends to narrow the breach and repair the damage.

Damage to Heavier Soils through Wind Erosion.

It has been briefly stated that some of our worst drifts occur on fallow land previously cropped with barley, following a wheat crop. This suggests that intense cultivation aids drift, but offers a debatable question as to whether from a monetary point of view it is wise to discontinue the practice or otherwise. In our district, wheat is the main crop and barley growing is more of a sideline. It is generally recognised that the continual cropping of wheat has a tendency towards making the land wheat sick, and a change to barley or oats greatly relieves this. Although the three-year rotation is favoured, farmers on small holdings are at a disadvantage to carry this out, and as barley grows equally well on stubble land, this practice is adopted. It has a lot in its favour, for it requires very little working and generally not much more than half the amount of superphosphate. It is mostly the last crop to be sown unless required for grazing purposes and later left for grain, yet it is the first to yield some monetary return for labour expended. It provides quite a lot of summer feed, too; the only point is, should barley be grown on stubble land?

If we take the opposite view, and instead of cropping the stubble with barley, allow it to remain for grazing, what advantages does it offer? We could probably carry more sheep according to the acreage and they would return to the soil what they took from it. The humus thus provided would no doubt be a factor in the production of a better return in the future years. Wind erosion would be averted, and this appears the main feature. Land that has been cropped with barley following a wheat crop is not the only land to drift, so we must look for other means. Undoubtedly the constant stirring of the soil renders it more susceptible to drift and this, coupled with the meagre winter rainfall during the latter years, plays a very big part.

At one time practically all fallowing was done with the plough, but of late years quite a lot is done without the aid of this implement, probably because the land is not so hard as to warrant its use and the cultivator is deemed sufficient. After this come the harrows, and the land is brought to a fine even surface, which after summer rains is liable to drift. As soon as weeds appear after rain, the harrows are again brought into use. We cannot condemn this practice, inasmuch as it is a big factor in conserving soil moisture. Possibly if our land were broken up with the plough or even the cultivator and left in a rough state, it might assist Nature in playing her part, for sun and air are most essential for the bacterial life in the soil. Sheep could be run over this to keep the weeds in check until such time as it required another cultivation with a rigid-tyne cultivator. If left ridgy it would be a deterrent to wind erosion. At seeding it could be brought to a fine tilth by the use of the harrows after the combine.

Another point worthy of consideration is whether we should burn the stubble or leave it to be broken up by stock and later turned in to provide organic matter which would create humus and assist very materially in binding the soil.

In summarising, might I suggest:—In the three-year rotation system refrain as far as possible from growing two consecutive crops, whether barley or wheat, on the same land, and the more frequent use of the plough or rigid-tyne cultivator for fallowing. Return to the soil as much organic matter as possible by leaving the stubble and grazing the land with stock. Greater attention should be paid to land of a sandy nature by planting suitable grasses or lucerne for grazing purposes in preference to cereal growing. Where it is essential to harrow the fallow in order to retain the moisture and for the destruction of weeds, the work should be done as soon after rain as possible. These no doubt are debatable questions, but this paper was written for the purpose of eliminating as far as possible "wind erosion of the soil," and even if we have to make some sacrifice in our immediate monetary returns, it will eventually bring its reward.

Citrus Culture.

[M. R. DUNSTAN (Waikerie).]

Young trees should be planted not less than 24ft. apart and provision should be made for adequate wind protection.

WATERING.

To set a good crop it is essential that the trees should not suffer from lack of moisture from the time they start to shoot until about Christmas. After that time, even if the trees wilt badly, they seem to hold their fruit. The multi-furrow system, with a furrow well under the skirt of the tree (this can be done with a grape hoe fitted with a buster, and will last in some instances for several irrigations), run through quickly will give the best results. The furrows under the trees I have found useful for the quick run through irrigation made available this year.

MANURING.

End of July or Early August.—Four pounds of ammonia and 1lb. of potash per tree.

Before the Third Irrigation.—Four pounds of ammonia per tree.

April.—Alternate rows should be sown with rye and about 3cwts. H.G. super.

Autumn.—Rows not sown to green crop should receive 8 to 10 tons of stable manure or bonedust, or blood manure at rate of 5cwts. per acre. If the trees are looking well apply bonedust; if not, blood manure. During the last four years I have varied this practice by bursting out alternate rows each year, placing bonedust in the bottom of the furrows and filling up with stable manure or distillery refuse, so that now at the end of the fourth year I have each tree with a square of deeply buried manure around it.

The Multi-furrow system.

PRUNING.

This should be done, if possible, when the tree is free of fruit. The presence of oranges on the tree influences the pruner to leave limbs which should come out. The majority of our trees have too many arms, making harvesting in the tree difficult and excluding light, which is essential for the production of inside fruit. The top of the tree should be kept open for light, and occasional gaps help to keep the inside wood healthy. I always go through my trees as soon as the fruit is off to shorten back and thin out rank growth. The trees should be pruned off the ground, but not higher. If the limbs come down with the fruit, staking will pay, as the best fruit is produced low down and is most convenient to harvest. If a high standard of fruit is to be produced, dead wood must be pruned out. If the trees are kept open, dead wood production will be reduced to a minimum.

CULTIVATION.

In recent years I have relied chiefly on the disc cultivator for breaking down cover crops. In the other rows I plough deeply after applying stable manure or bonedust in the autumn. Any deep ploughing between August and Christmas is likely to have an adverse effect on the setting of the crop. A good deep ploughing is necessary every two or three years, and the time when it is least likely to upset the trees is in the autumn.

HARVESTING.

Fruit on the ground or near to it should be picked first, after which trees should be stripped, starting on the portions of the orangery most liable to damage by wind.

PEST CONTROL.

In our climate, if the trees are kept open, there should be little trouble with brown scale. Sulphur dusting seems to be the most effective control, failing fumigation.

It should be the aim of every grower to produce at least 75 per cent. of standard fruits, even if it is necessary to sacrifice some trees so that a windbreak may be planted. Over a period of 10 years they will be amply repaid.

Activities of Women's Branches

Karte Exhibition and Sports.

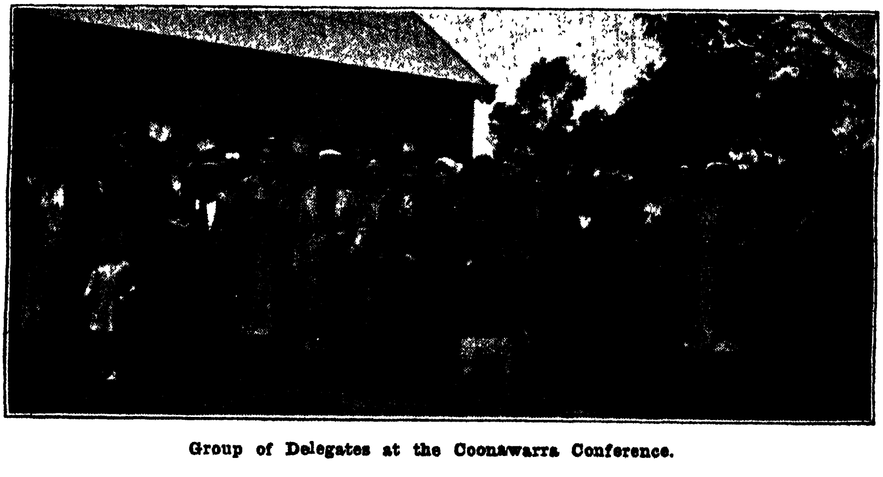
The members of the Men's and Women's Branches of the Karte Agricultural Bureau have every reason to feel proud of the success they achieved at their Annual Exhibition and Sports held in that district on 31st March. Since these two Branches have been formed enthusiasm has been their keynote. The meetings have been well attended, and any functions organised have been whole-heartedly supported. The exhibition and sports was their second attempt in this regard and it eclipsed their initial effort of last year. They received wonderful support, not only from their members, but from outsiders, and the day was an unqualified success in every way. The exhibition entries totalled 288 which was 20 more in excess of those received last year. There were some excellent exhibits to be seen among the large collection, some of which would do credit to the Pinnaroo Agriculture Society's Show. The day attracted a large number, including spectators from Pinnaroo, Karte, Peebinga, Lameroo, Parilla Well, Parilla and other surrounding districts.

A very pleasing aspect was the financial side of the day. The door takings amounted to £2 1s. 6d. more than last year, and a bigger profit will be made on this occasion than previously.

The Exhibition was opened at 3 p.m. by Mrs. H. G. Billing, of Lameroo. The judges for the various sections were—Cookery, Mesdames R. E. Welden, H. Schumann and Miss Colwill; Preserves and Fancywork, Mesdames Johnston, Nordhausen and G. Pahl; Flowers, Mesdames P. N. Dowd and J. Webster; Vegetables, Mr. A. F. Young; Farm Produce, Mr. J. H. Dewhirst.

The hall presented a wonderful sight with its many multi-coloured flowers, fancywork, cookery, &c. In addition to the Exhibition, sports were conducted, and these too, proved highly successful. Miss L. Vesey was the convener for the children's sports. The judges for the day were Messrs. D. Frieman, F. Huckel and C. Furniss. Good entries were received for most of the events which consisted of novelties. These novelties proved entertaining events and some provoked amusement.

In the ladies' stepping the distance the first and second special prizes were donated by Mr. T. H. Dunsford, Adelaide, and were won by Mrs. Webster and Mrs. A. Nordhausen respectively. A special first prize was donated by Mr. R. F. Gum, of Adelaide, for the ladies' nail driving, and this was taken by Mrs. W. Flavel. A special prize donated by Mr. H. Bain, for bowling at the stump, was won by G. Atze. In the ladies' cotton winding, Mrs. M. E. Small was successful, while the cigarette race was taken by Mr. and Mrs. D. R. Freeman. The gents' stepping the distance



Group of Delegates at the Coonawarra Conference.

went to G. Atze, and A. Fiebig was successful in the nail driving. A wheel-barrow race provided a win for G. Trowbridge, and the rooster chase, which caused amusement, was won by A. Matschoss.

A dance was held in the evening and was well attended.

PRIZE LIST.

Vegetables.

Collection of vegetables, C. H. Atze 1, Miss G. Fiebig 2; 3 apple cucumbers, Miss F. Bierwirth 1, C. H. Atze 2; 3 long cucumbers, Miss J. Holmes 1, C. H. Atze 2; 6 tomatoes, E. B. Franklin 1, C. H. Atze 2; bundle rhubarb, C. H. Atze 1, Miss J. Holmes 2; 6 long carrots, C. H. Atze 1, Miss J. Holmes 2; 6 short carrots, C. H. Atze 1, Miss G. Fiebig 2; marrow, Miss G. Fiebig 1, Miss E. Atze 2; pumpkin, H. Gale 1, C. H. Atze 2; citron melon, Miss E. Atze 1, Gordon Atze 2; Pie melon, Miss F. Bierwirth 1, Miss J. Holmes 2; water melon, C. H. Atze 1, Gordon Atze 2.

Farm Products.

Best sample of wheat, A. A. Bierwirth 1, A. Mattschoss 2; best sample of oats, A. Mattschoss 1, H. Gale 2; best sample of rye, H. Gauld 1; sheaf H. Gale 2; best sample of rye, H. Gauld 1, sheaf oaten hay, A. Bierwirth 1, D. Freeman 2; bundle lucerne, A. Small 1, C. B. Trowbridge 2; kerosene tin wheaten chaff, A. Mattschoss 1, C. H. Atze 2; kerosene tin oaten chaff, A. Bierwirth 1, A. Bierwirth 2; bundle wheat full grain, G. Atze 1, C. H. Atze 2; best pegged out rabbit skin, Cyril Atze 1, Cyril Atze 2; something useful out of something useless, G. Atze 1, D. R. Freeman 2.

Cookery.

Loaf of bread, Mrs. C. Gum 1, Mrs. C. Gum 2; yeast buns, Mrs. A. Bierwirth 1, Mrs. D. Freeman 2; scones, Mrs. D. Freeman 1 and 2; coffee cake, Mrs. A. Mattschoss 1, Mrs. D. R. Freeman 2; ribbon cake, Mrs. A. Mattschoss 1, Mrs. A. Bierwirth 2; sponge sandwich, Miss G. Fiebig 1, Mrs. A. Bierwirth 2; chocolate sponge, Miss E. Atze 1, Mrs. A. Mattschoss 2; Jam tarts, Mrs. A. Mattschoss 1, Miss E. Atze 2; cream puffs, Mrs. A. Mattschoss 1, Mrs. C. Gum 2; biscuits, 6 varieties, Miss G. Fiebig 1, Mrs. A. Mattschoss 2; dark fruit cake, Miss E. Atze 1, Miss G. Fiebig 2; sultana cake, Mrs. A. Mattschoss 1, Mrs. A. Bierwirth 2; 6 small cakes, Mrs. C. Gum 1.

Preserves, &c.

Pickles, Mrs. A. Mattschoss 1, Miss E. Atze 2; tomato sauce, Miss E. Atze 1, Mrs. A. Mattschoss 2; tomato chutney, Mrs. A. Mattschoss 1, Miss E. Atze 2; jam, 3 varieties, Miss E. Atze 1, Miss G. Fiebig 2; marmalade, Miss G. Fiebig 1, Mrs. H. Gauld 2; 1lb. butter, Miss E. Atze 1, Mrs. A. Mattschoss 2; collection of fruit, Miss J. Holmes 1, Mrs. A. Mattschoss 2; 1 doz. eggs, Mrs. A. Mattschoss 1, Miss G. Fiebig 2.

Flowers.

Bowl of dahlias, Miss E. Atze 1, Miss G. Fiebig 2; vase of cosmos, Miss F. Bierwirth 1, Miss E. Atze 2; vase gallardias, Miss E. Atze 1, Miss G. Fiebig 2; vase perennial aster, Miss G. Fiebig 1, Miss J. Holmes 2; decorated vase flowers, Miss F. Bierwith 1, Mrs. A. Mattschoss 2; vase miniature sunflowers, Miss E. Atze 1, Mrs. C. Gum 2; 1 dahlia peony, Miss F. Bierwith 1, Miss E. Atze 2; 1 sunflower, Mrs. C. Gum 1, Miss J. Holmes 2; 3 carnations, Miss E. Atze 1 and 2; 1 rose, Miss E. Atze 1, Miss G. Fiebig 2; 3 zinnias, Miss E. Atze 1, Miss G. Fiebig 2; flower not mentioned, Mrs. D. Freeman 1, Miss E. Atze 2;

The Committee of the Snowtown Women's Branch.

posy, Mrs. A. Mattschoss 1, Miss G. Fiebig 2; pot plant, Miss E. Atze 1 and 2; fern, Miss E. Atze 1 and 2.

Fancy Work.

Bag apron, Mrs. A. Mattschoss 1, Miss G. Fiebig 2; table centre, Miss J. Holmes 1, Miss N. Holmes 2; vanity set, Miss J. Holmes 1, Miss E. Atze 2; fancy cushion, Miss N. Holmes 1, Miss E. Atze 2; knitted article, Miss F. Bierwirth 1, Miss J. Holmes 2; baby's crochet bonnet in wool, Miss G. Fiebig 1, Miss E. Atze 2; crochet d'oyley, Miss E. Atze 1 and 2; worked d'oyley, Miss N. Holmes 1, Miss F. Bierwirth 2; something useful out of something useless, Mrs. D. R. Freeman 1, Mrs. D. Freeman D.

Children's Sports.

Boys' flat race, 10-14 years:—Lionel Gregory, 1; Don Gum, 2.

Girls' flat race, 10-14 years:—Jessie Flavel, 1; Muriel Bierwirth, 2.

Boys' flat race, 6-10 years:—Len Bierwirth, 1; Sid Flavel, 2.

Girls' flat race, 6-10 years:—Denise Gum, 1; Doris Flavel, 2.

Boys' potato race, 10-14 years:—Bob Flavel, 1; Don Gum, 2.

Girls' potato race, 10-14 years:—Jessie Flavel, 1; Mary Huckel, 2.

Boys' potato race, 6-10 years:—Sid Flavel, 1; Len Bierwirth, 2. ;

Girls' potato race, 6-10 years:—Denise Gum, 1; Doris Flavel, 2.

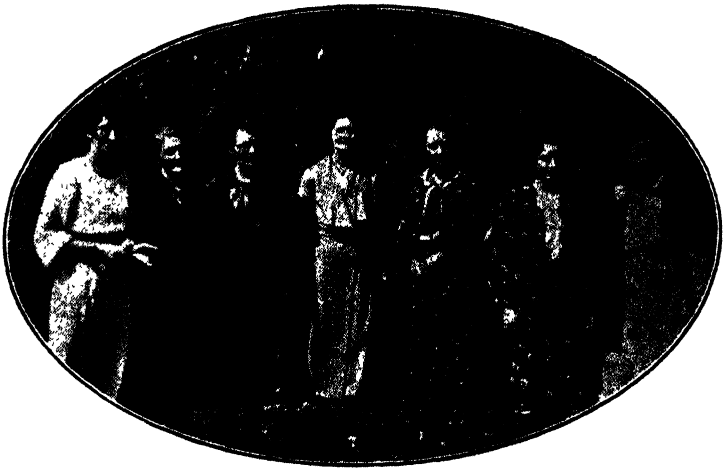
Boys' sack race, 10-14 years:—Bob Flavel, 1; Don Gum, 2.

Girls' sack race, 10-14 years:—Mary Huckel, 1; Jessie Flavel, 2.

Boys' sack race, 6-10 years:—Len Bierwirth, 1; Sid Flavel, 2.

Girls' sack race, 6-10 years:—Denise Gum, 1; Doris Flavel, 2.

Boys' and girls' flat race under 6 years:—Desmond Fiebig, 1; Cliff Fiebig, 2.



The Committee of the Morchard Women's Bureau.

Blyth Seed Wheat Competition.

The Annual Seed Wheat Competition conducted by the Blyth Branch was judged on 5th May by Mr. O. Bowden (District Agricultural Adviser). There were 14 entries for Class I., "Best Two Varieties." Mr. M. R. Williams was the successful competitor in this class with Ranee and Dundee, each variety gaining 91 points of the maximum 100. Class II., the Champion Variety selected from entries in Class I., was won by Mr. W. O. Eime with Dundee, which gained 92 points. Mr. C. Hutton secured second position with Sword, gaining 91½ points. Varieties exhibited comprised:—Dundee (8 entries), Ranee (7), Bencubbin (2), Ford (4), Sword (4), Nabawa (1), Merredin (1), and Gluford (1). Mr. Bowden presented prizes and trophies to successful competitors.

JOURNAL

OF THE

Department of Agriculture

OF

South Australia

VOL. XL. JULY, 1937. No. 12

Published Monthly by the Department of Agriculture Edited by H. C. PRITCHARD

	Page
Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836-1936	897-913
Wireless Talks	914-915
The Recovery of Wheat Prices and Some Agricultural Reflections Thereon	916-924
Final Results of Cereal and Hay Harvest, 1936-37	924-925
Wheat Growing in the Mallee	926-934
Cropping Results of the 1936-37 Season at Roseworthy Agricultural College	935-943
Wheat as a Foodstuff	944-945
The Red Legged Earth Mite	946-948
Danish Pig Industry	949-950
Tobacco Growing	951-953
Agricultural Bureau of South Australia—Conferences	954-955
Important Weeds of South Australia	956-958
Rainfall Table	961-962
Papers Read at Conferences	964-983
Papers Read at Branch Meetings	983-997
WOMEN'S BRANCHES.	
Bureau Reports	997-1014

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A. P. BLESING, *Minister of Agriculture*

Printed and Published for the Department of Agriculture by FRANK TRIGG,
Government Printer, Adelaide.

Agricultural Bureau Conferences, 1937

Pinnaroo Line, at Lameroo, Tuesday, 3rd August (Mr. J. L. Byrne).

Murray Lands West, at Karoonda, Thursday, 5th August (Mr. W. R. Trestrail, Coomandook).

Southern, at Milang, Thursday, 19th August (Mr. L. E. Yelland and Miss Ruth Whitfield).

Murray Lands East, at Taplan, Tuesday, 28th September (Mr. G. R. Hodge and Mrs. Hodge).

Eyre's Peninsula (East), at Cowell, Monday, 18th October (Mr. S. D. Ramsey, Cowell), Miltalie Branch.

Eyre's Peninsula (Lower), at Ungarra, Wednesday, 20th October (Mr. W. G. Gordon).

Eyre's Peninsula (Central), at Poochera, Friday, 22nd October (Mr. F. R. Joy).

Fruit Districts, at McLaren Flat, Tuesday, 2nd November (Mr. W. H. Kyloh).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.							
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Atlantic Ports.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	
	June.	June.	June.		June-	July-Aug.	Sept.	
1937.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	
June 10..	5 6	5 4⅛	5 5¼	—	5 3	5 4¾	5 4⅜	—
June 17..	5 6	5 5⅝	5 7⅛	—	5 3	5 4⅛	5 4⅛	South Australia—2,000 tons (afloat) at 5s. 5¼d. 300 tons at 5s. 5⅝d.
June 24..	5 6	5 4⅛	July. 5 7⅞	—	5 3⅜	5 6¾	5 6	—
July 1..	5 8¼	July. 5 9	6 2¼	—	5 6⅜	5 9⅜	—	—
July 6..	July. 5 10⅛	5 10	6 7½	—	July-Aug. 5 7½	6 2¼	6 0	—

THE JOURNAL
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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By Arthur J. Perkins, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 841.)

THE FIRST DECADE, 1836-1846.

CHAPTER VI.

Acting-Governorship of G. M. Stephen—His address after taking oaths of office—Public meeting to consider support of Police Force—Arrival of E. J. Eyre with herd of cattle by overland route from New South Wales—His difficulties in marketing the cattle—D. McLaren's dubious position as both commercial manager and Bank manager—Arrival of Captain Sturt with "overland" herd of cattle from New South Wales—Public dinner to Sturt—"Country green slips"—Fisher's difficulties over same—Gawler's closing decision in the matter—G. S. Kingston's four months' work with the Survey—Address to G. M. Stephen on his retirement from office and its unexpected consequences.

The advancement in worldly status achieved by George Milner Stephen in the year 1838 was little short of meteoric: in January and early February of that year he was plying the quill of an industrious clerk in the Supreme Court of Van Diemen's Land—"an inferior, but very useful office." (1) On the 9th of the latter month, in replacement of Charles Mann, resigned, (2) G. M. Stephen was gazetted Advocate-General and Crown Solicitor in the province of South Australia—probably on the recommendation of the late Judge, Sir John Jeffcott, who had many contacts with the island colony. And a little more than five months later—on the 16th July, 1838—"he took the oaths of office as Acting-

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(1) *Southern Australian*, 28th July, 1838, page 3, col. 2.

(2) *South Australian Gazette and Colonial Register*, 4th August, 1838, page 3, col. 2.

Governor and Commander-in-Chief" of the same province. (³) His brief subsequent rule—Governor Gawler displacing him on the 12th October, *i.e.*, twelve and a half weeks later—was almost as troublous as the longer reign of his namesake of early Norman Britain. From the outset he was not allowed to occupy the stage in solitary grandeur: there were, it appeared, two pretenders to the uneasy, if exalted position, into which Stephen had been so astonishingly thrust, namely, the Resident Commissioner—J. H. Fisher—on the one hand; and the former Advocate-General—Charles Mann—on the other. Both of them agreed that Stephen had no legal title to the office he had assumed: and both, be it understood, were lawyers and should have known the extent to which their claims were more valid than his; but they differed as to which of the two had a sounder title thereto; and they proceeded to give proof of their good faith in the matter by studied absence from Stephen's ceremonial installation, and by subsequent insidious personal attacks both in the public press and elsewhere. And thus the opposing local editors—Stevenson and Mann respectively—were unexpectedly presented with a new bone to wrangle over: for during this brief period Stevenson was on the side of the angels, albeit for the time being but a lukewarm partisan in contrast with the rabid fluency of his disappointed fellow-editor. From such small beginnings, and in so brief a space of time, there gradually developed in the turbulent South Australian arena a new party—the Stephen party—with which at a later date David McLaren, who knew "no party save that of the South Australian Company," reproached Governor Gawler for seemingly identifying himself. (⁴)

Geo. Milner Stephen.
Successively Advocate-General, Acting Governor and Colonial Secretary.
[*Courtesy Archives.*] [*Plate* 38.]

It cannot be denied that Stephen's opening move—an address delivered to the select few who were privileged to witness the administration of the oaths of office and subsequently reproduced in the *Gazette Extraordinary* (⁵)—although not altogether flawless, had nevertheless its special merits. It was modest and deprecatory in tone; studiedly loyal to his benefactor and predecessor in office; courageously frank as to the financial predicament of the colony: but deliberately provocative to the Colonisation Commissioners, to whom he could scarce expect to give satisfaction in his new office, seeing that such a privilege had been denied to his distinguished and more talented predecessor. And, finally, it expressed dignified regret that the more important avocations of the Resident Commissioner should have debarred the latter from affording to him the support of his presence on so important an occasion.

The immediately apparent result of this mild and courteous oration was to throw open the floodgates to caustic and derisive criticism. The Acting Governor had committed the unpardonable sin of uncovering the nakedness of the land: he had broadcast to the world the emptiness of the Treasury vaults—

(³) *South Australian Gazette Extraordinary*, 16th July, 1838.
(⁴) David McLaren to Edmund J. Wheeler, 26th October, 1838.
(⁵) See Appendix II. at back of volume.

"What!" exclaimed the irrepressible Mann, "Not a stiver!" (⁶). He had expressed inability to pay the salaries of public servants, inclusive of the Police Force, upon which alone since the departure of the marines on the *Alligator*, had fallen the task of defending a well nigh defenceless province. He had sought to shift the responsibility for the perilous predicament in which the colony found itself, from the shoulders of the fugitive Hindmarsh and his local abetters, to those of the distant but innocent Colonisation Commissioners. Nor did his meteoric rise to place and power at the expense of abler and better qualified men escape the shafts of the critics.

Eventually an opportunity for the expression of public opinion in the matter seemed to develop at a public meeting of the 30th July, specially convened to determine what steps had best be taken for the maintenance in the immediate future of an efficient Police Force. As was customary at such meetings, long and desultory discussion ensured; but from the babel of tongues emerged the settled conviction that a well paid and efficient Police Force was at the time absolutely essential to the wellbeing of the community; and that if the Government lacked the funds for its adequate upkeep, then immediate steps should be taken to make such funds available, either by private contributions or by special taxation. The whole question was eventually referred to a special Committee for examination and recommendations. The Committee considered it to be its first duty to secure ample details concerning Government finances—both past and present—and approached the Acting-Governor accordingly. But the latter, since the delivery of his installation address, had come to perceive that it was possible to push frankness to the verge of indiscretion, and in the present instance decided that he had best decline "to furnish official details of the Government to any three or four private individuals, however respectable their station in society": and for their special edification he added that "from his private funds he had sent £200 to the Treasury, as a loan to the Government for the support of the Police Force". (⁷) This impulsive act of Stephen, itself unexpected, led almost immediately to quite unexpected reactions, including smouldering rancour in the breasts of a few—in particular of the members of the Committee who had approached the Acting-Governor—soon to burst into futile flame shortly after the latter had surrendered the reins of government to Colonel Gawler. True, there were some who protested that even the temporary burden of supporting the Police Force should not be left to a single individual, and least of all to the Acting Governor—and it seemed probable that these views were tacitly shared by a comfortable majority of the citizens present; but there were others—and these not the least vocal—who perversely enough could see nothing better in an obviously quixotic act than an unfair attempt to curry favour with the public. At this distance of time it was perhaps possible to see that there was little, if anything, to warrant a sinister misconstruction of an act, which at best was a spontaneous act of goodwill, and at worst a sub-conscious urge in some way or other to render satisfaction, however inadequate, for preferment that had come "out of the blue", and had perhaps exceeded apparent deserts. In any event, the meeting dispersed after its third sitting, in somewhat disgruntled mood, leaving the maintenance of the Police Force to the Governor's generosity.

During Stephen's brief tenure of office there were three occurrences which may be said to have had some influence on the land settlement of the colony. Firstly, the successive arrivals in the colony of Edward John Eyre and Captain Charles Sturt respectively by overland routes from Sydney with important herds of cattle: secondly, the unfortunate episode known as the "green country slips"; and, thirdly, the progressive allotment of land by the Survey Department to expectant settlers.

(⁶) *Southern Australian,* 21st July, 1838, page 3, col. 1.

(⁷) *South Australian Gazette and Colonial Register,* 4th August, 1838, page 3, col. 4.

Edward John Eyre, who was later to render signal service to South Australia as one of the intrepid explorers of its unknown territory, and later still to become the tragic subduer of rebellion in Jamaica, in consequence of which he was pursued subsequently by legal persecution for many a year—Eyre, we say, was born in Yorkshire in 1815, and came out to New South Wales in 1833, where he engaged in pastoral pursuits. Early in November, 1837, he had set out from Sydney, for the purpose of collecting a herd of cattle in the southern districts of New South Wales, and driving it subsequently overland to South Australia. He thus would seem to have anticipated Hawdon's departure from his Western Port Station by six or seven weeks: he was not, however, able to leave the Port Phillip district for Adelaide with his herd of cattle until the 9th February, 1838; whereas Hawdon reached his cattle station on the Hume on the 7th January, and left subsequently for the Goulburn River on the 17th, reaching Adelaide on the 3rd April, 1838, *i.e.*, more than ten weeks ahead of Eyre.

Eyre brought with him three hundred head of cattle, of which three working oxen only were lost in the course of the long journey, having strayed away at night in search of water. He was accompanied by six men, three drays, and some horses, six of which he was compelled to let loose in the wilderness, when exhausted, and they had been unable to find their way back to camp. Eyre considered his party too small for a trip, which by reason of unavoidable miscalculations, unfortunately extended from the 9th February, when the party left the Port Phillip district, to 13th July, when it reached Adelaide, *i.e.*, over twenty-two weeks for a journey which Eyre had hoped to cover in nine weeks. In order to achieve the latter end, he had proposed avoiding the long northward journey to the Murray, and the reputed hostility of the Murray blacks, by cutting across country at about the latitude of Bordertown, *i.e.*, between the 36th and 37th parallels of latitude.

Accordingly, after crossing the Mount Alexander Range, in the Port Phillip district, the party proceeded in a north-westerly direction, in the hope of coming across the Yarraine, which Major Mitchell had described as a "deep but narrow stream flowing to the westward, with a mean depth of nine feet", and which in consequence Eyre had hoped would supply the party adequately with water to the eastern boundaries of South Australia. Unfortunately, when finally found, this "deep but narrow stream" turned out to be nothing more than a *wet-season* creek, which in May, 1838, was "perfectly dry": and as Hawdon had discovered before Eyre, the Yarraine, instead of following a westerly direction towards the Murray, took instead a course almost due north, discharging finally in flood time into the Hume. The realisation of these facts drove Eyre to an alteration of plan: he however still clung to his original idea of avoiding the circuitous northern route, with its hostile natives; and accordingly, the party retraced its steps southwards in search of Major Mitchell's Wimmera River, which was reached close under the Grampians from which it sprang. The Wimmera was then followed in a north-westerly direction, until it was found to empty itself into a broad sheet of fresh water, about 40 miles in circumference, which Eyre named "Lake Hindmarsh" in honour of the then Governor of the colony, towards which he was painfully endeavouring to drive a herd of cattle.

"From Lake Hindmarsh," said Eyre, "I could discover water in no direction to the northward or the westward, notwithstanding a laborious and anxious search of three weeks; during which I attempted with two men and six horses, to penetrate across to the Murray or the Lindesay, through a country very thickly covered with scrub, and in which no grass could be procured for horses. After travelling four days and penetrating upwards of one hundred miles, our horses were so reduced from the want of food and water, that I found it impossible to proceed, and was obliged to turn them loose in hopes that they would retrace their steps to the last water they had left: and myself and the two men with some difficulty returned on foot, after being absent eight days from our party, without finding any water through the country we had traversed. Two of the horses we afterwards found dead; but what became of the other four we never could discover, as their tracks could not be followed in the direction they had taken; but I fear all shared the same fate.''

''Combining the fact of my having in two instances penetrated far into the interior to the north-west, and at a distance of ninety miles in longitude apart, with the perfectly level nature of the country south of the Murray, to the Grampians, I am inclined to think . . . that there is in reality no body of water running beyond the 36th parallel of latitude towards the Murray to the westward of the Goulburn River: so that the hope of being able to avoid the circuitous and, at some seasons, hazardous route of the Murray, by crossing the interior to the southward of that river, is at once done away with; and the fact ascertained that there is but one practicable line of road between the two colonies —unless, indeed, the line of coast should afford those facilities, which the information we at present possess respecting it would not lead us to anticipate it doing.''

''On being unable to proceed with my party to the northward or westward of Lake Hindmarsh, I was compelled to put the whole party on very reduced rations of flour and meat—reluctantly to retrace nearly the whole of my course to the 144th degree of longitude, when I crossed the Yarraine. This we accomplished; and finding small pools of water in its channels at intervals of ten to fifteen miles, I followed its course nearly north to the River Hume, and continued down that river and the Murray in the same course as Mr. Hawdon. I found no impediment in the way, and arrived here after a rapid and successful journey of nine weeks from the Yarraine. It may perhaps be as well to state that on passing the Rufus, a channel of communication between Lake Victoria and the Murray, there was but little body of water in it, and we had no difficulty in crossing; but that we did not find either the Murray or the Darling River fordable for our stock at the places where Mr. Hawdon crossed, both of these rivers being I imagine considerably higher than they were then.''

'' . . . . The natives were found very numerous, particularly to the westward of the Darling River; but they were for the most part tractable and friendly, and I endeavoured to promote this good feeling, as much as lay in my power, by making them such small presents as I could, and encouraging them to barter some of their nets (which are quite a curiosity) for tomahawks. . . . . In conclusion I would remark that though the line of road between this colony and New South Wales is far from being favourable for the emigration of sheep, yet I consider it by no means impracticable; and I think that if they are brought in small flocks and a favourable season of the year selected, the experiment may be safely and successfully attempted; and the colonists of this flourishing settlement have the pleasure of seeing an additional source of wealth and prosperity introduced to them at a much lower rate than can be done by water.'' (8)

There were no public dinners, no flowing bowls and eloquent speeches to welcome the arrival in Adelaide of Edward John Eyre, after an arduous overland journey of over 22 weeks. It was his misfortune to have been sandwiched in between Joseph Hawdon, who had outstripped him by a few weeks for the honour of pioneering *overland stock droving* to South Australia, on the one hand, and of Captain Charles Sturt, the discoverer of the Murray and of South Australia, who was known to be close upon his heels with another herd of cattle, on the other. But in addition to this handicap the particular time of Eyre's arrival in South Australia, cannot be described otherwise than ''politically inapt.'' Three weeks earlier, the *Rapid* on its return from England, had brought a letter of recall to Governor Hindmarsh, together with instructions for revolutionary changes in the country surveys, which had led to the almost immediate resignation of Colonel Light and his Assistant Surveyors; and the temporary elevation of G. S. Kingston to a position which he had long coveted, but had not the ability to hold. It had brought rumours, too, of the impending dismissal of J. H. Fisher from the office of Resident Commissioner, and of a contemplated judicial enquiry into his stewardship. Finally, on the day following Eyre's arrival, Captain Hindmarsh had boarded the *Alligator* on his way to England to vindicate his character and administration, leaving his future son-in-law to face a vehement, though for the time being numerically weak opposition. This combination of political gunpowder had led to considerable local unrest and disquietude; and important as Eyre's arrival in South Australia certainly was to the future prospects of the community, it nevertheless passed almost unnoticed at the time, barely mentioned by the politically minded press. Eventually Eyre, although the most modest of men, was compelled to draw attention to himself by means of a letter to the press, in which he outlined what he had accomplished during his journey, and what he had attempted to accomplish; and it was from this letter that the extracts already given had been taken. But Eyre was faced with another difficulty, to a slight extent only related to the lack of recognition with which he had been met: his overland journey although exploratory in intention, had also its business side: in other words, his cattle were for sale, and most private individuals being short of cash at the time in the colony, there appeared to be no buyers in sight. This difficulty of Eyre to market his cattle led to an incident not altogether to the credit of David McLaren, as Manager of the Bank of South Australia, if not as Commercial Manager of the South Australian Company.

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(8) *South Australian Gazette and Colonial Register*, 21st July, 1838, page 3, col. 4.

David McLaren was a remarkable man with a rather pronounced dual personality: an exceptionally able business man, of sound judgment, far-seeing, tenacious, cautious without timidity, and absolutely devoted to the interests of his employers—the South Australian Company, on the one hand: on the other, he was a man of high religious principles, almost to the point of fanaticism, who without conscious hypocrisy could keep his religious interests quite apart from his business ones: to such an extent that it could be more truly said of him than of most men, that his right hand knew not what his left one was doing, and *vice versa*. Unfortunately in his business life he does not seem to have been able to bring this dual principle into play: that is to say, he found it extremely difficult to keep his banking responsibilities quite apart from his commercial ones: in fact, as a matter of everyday practice, it could be said that the commercial manager conferred with the bank manager on all questions of any consequence: and this could not well have been to the advantage of the bank's private clients, many of whom were the commercial rivals of the commercial manager. And it seemed to be on this rock that McLaren's commercial morality and usual public spirit went to pieces in the matter of the sale of the Eyre cattle. This affair was seized upon by George Stevenson to attack the South Australian Bank and the South Australian Company with considerable acrimony in the pages of the Register. (⁹) I do not propose to make use of these press controversial statements; but shall rather endeavour to convict McLaren from words out of his own mouth. Early in September McLaren wrote that "lately Mr. Eyre, who brought over the second overland herd from New South Wales was very anxious I should buy his herd, nearly 300. He asked £12: I offered him £9, 5 per cent. discount for cash, before we heard of the proposed establishment of the Bank"—*i.e.*, the rival Bank of Australasia—"he refused; negotiation was lately renewed by him; he would have taken £9 by draft payable on London. I would not give it. Another party came to terms with him, that party having misunderstood what I said as to discounting drafts on London, closed the bargain with Eyre for the

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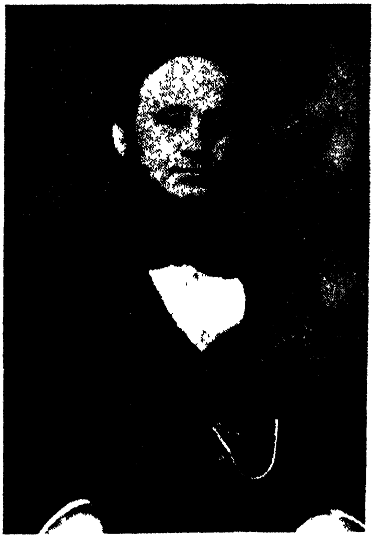
(⁹) *South Australian Gazette and Colonial Register*, 15th September, 1838, page 3, col. 1.

herd: but as I could get no satisfactory information as to the party himself (a stranger here) or as to his right to draw on Frederick Bouger, Secretary to the Australasian Bank, I refused to cash his draft. Mr. Eyre afterwards came to terms with the Joint Stock Cattle Co. and two of the Directors, Mr. J. B. Hack and Mr. C. H. Pollard, applied to the Bank for an advance in the way of discounting their acceptances: again I refused. Mr. Eyre renewed application to us, the only alternative besides being, he then thought, of opening a store for the sale of them after being killed, as Mr. Hawdon who brought the first herd overland did. I declined and finally he made an arrangement with Mr. Pollard who gave him land, etc., in exchange." (^{10})

"I think I mentioned to you formerly of the negotiation with Mr. Eyre on the Joint Stock Cattle Co. My principal reason for declining to purchase the herd was my determination to husband our cash and avoid increasing my drafts on you, and having declined to buy them, although so cheap, *on that account it would not have been commonsense to have furnished others with the means of buying them.*" (^{11})

We see here staged for the edification of future generations an elaborate comedy of "dog in the manger": Eyre offered his herd to McLaren, as commercial manager, at £12 per head: the latter, aware of the difficulty of finding cash buyers in Adelaide at that time, and out for a bargain, refused an admittedly low price but countered with an offer to purchase at £9 per head, less 5 per cent. discount, which Eyre in his turn declined. Eyre succeeded a few days later in finding an unknown and unnamed buyer, probably from New South Wales, who thereupon approached McLaren, as Bank Manager, requesting him to cash his draft on the Bank of Australasia: this McLaren, knowing the purpose for which the cash was needed, but well within his rights as Bank Manager, refused to do, on the ground that the intending buyer was locally unknown and without sufficient supporting credentials. Finally, Eyre came to terms with the Joint Stock Cattle Company, a highly respectable local concern, on the Board of Directors of which were some of the most respected and wealthy citizens of the colony: the latter body requested McLaren to discount their Bills for the purpose of purchasing Eyre's cattle. No longer able to decline these Bills on the grounds of insufficient security, McLaren, the Bank Manager, suddenly discovered the urgent need to husband the Bank's cash, and declined the Bills accordingly. But to his London correspondent he subsequently admitted that since he, as Commercial Manager, had been unable to purchase the herd at his price, it would have been lack of commonsense on his part as Bank Manager, to furnish others with the means of doing so! Assuredly an extraordinary attitude for a Bank Manager to take!



Edward Stephens (1811-1861).
First Cashier and Second Manager of the Bank of South Australia.
[*Courtesy Archives.*] [*Plate* 39.]

It was actions such as these that laid both the Company and the Bank open to the bitter criticism of its opponents: and men like Stevenson were never slow to take advantage of them. Incidentally it should be added that the "wordy"

(^{10}) David McLaren to Edmund Wheeler, 15th September, 1838.
(^{11}) David McLaren to Edmund Wheeler, 4th October, 1838.

defence of the bank, which Edward Stephens, its Cashier and subsequent Manager, undertook on this occasion, was on the whole an unconvincing and unworthy plea, based in the main upon the suppression of the truth and the suggestion of the false. (12)

On the 26th August, 1838, Giles Strangways reached Adelaide with the information that Captain Charles Sturt and his herd of cattle had entered South Australian territory, and had been left by him "all well" about 30 miles to the eastward of the southern bend of the Murray. And thus was effected the safe arrival of the third overland herd of cattle from New South Wales into South Australia. But Sturt, the discoverer of the Murray and inferentially of South Australia, was a great personage, whom it behoved to receive with due ceremony on his first visit to the province since its foundation. Accordingly a party of three—T. B. Strangways, E. J. Eyre, and Robert Cock, the first settler to reach Lake Alexandrina and the Murray from Adelaide—set out to meet Sturt and welcome him to South Australia. Sturt himself reached Adelaide on 29th August—exactly 100 days after leaving the Hume—leaving his party in charge of the herd "in a rich valley 28 miles to the south-east of Adelaide." Besides himself, Sturt's party consisted of Captain Finniss, McLeod, Giles Strangways, and eleven men. The herd comprised 250 cows and 180 bullocks, all of which reached South Australia in fine condition. The party left a "station on the Hume on the 22nd May and descended the river to a short distance above its junction with the Goulburn, when they crossed to the left bank and fell in with Hawdon's track, which they followed for some time. Captain Sturt, however, deviated from that track, and preferred crossing the Murray *below* its junction with the Darling in place of *above* as both Mr. Eyre and Mr. Hawdon had done, which was effected about five miles below the Darling. The body of the cart was unshipped and lined with a good tarpaulin, which formed a boat sufficiently commodious to transport the baggage and provisions to the right bank of the river, which was about 150 yards wide and about six fathoms deep. The cattle swam across in safety. The natives on the Hume were not very numerous and seemed rather shy—a consequence probably of Major Mitchell's treatment of them some years ago. At the crossing place of the Murray they were much more numerous and troublesome, besides being expert thieves. They possessed very large canoes made of bark, and capable of carrying 12 to 14 men. They have also very strong and well-knit fishing nets, in which they procure fish in considerable abundance. The country immediately on the left bank of the Murray is but indifferent—improving, however, as it approaches South Australia; and we are glad to add another testimony to those we have already collected, that the ranges between the Murray and Adelaide are far superior in richness and fertility to any that have yet been discovered in the territory of New South Wales." (13)

Robt. Cock,
First settler to reach Lake Alexandrina and the Murray from Adelaide.
[*Courtesy Archives.*] [*Plate* 40.]

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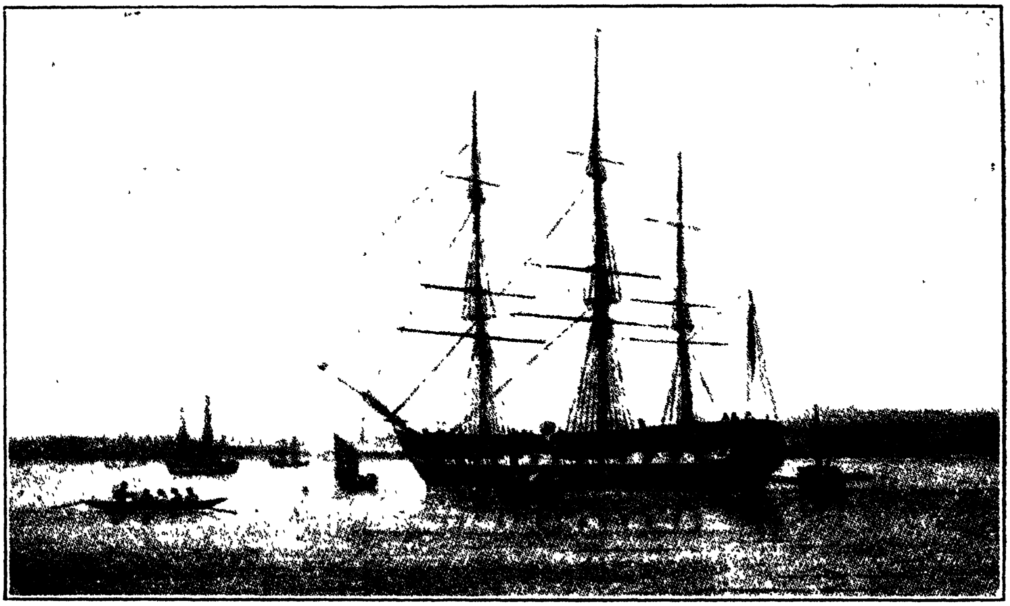
(12) *Southern Australian,* 22nd September, 1838, page 4, col. 4.

(13) Giles Strangways' account in *South Australian Gazette and Colonial Register,* 25th August, 1838, page 3, col. 2.

Like Joseph Hawdon, but unlike Edward Eyre, Charles Sturt was given an official dinner, presided over by John Morphett, and honoured by the attendance of the Acting-Governor and "upwards of one hundred of the most respectable inhabitants" of all shades of political opinions. "After dinner, Mr. John Morphett read a letter accounting for his being in the chair, addressed by Colonel Light to the effect that he declined to preside upon the occasion—but whether from illness or from what cause was not stated." ([14]) Such was Stevenson's account of a trivial incident—Light's absence from the banquet—and it has been given textually in order to illustrate the unfair tactics of this prominent journalist when dealing with individuals with whom he was out of touch. Light did not "decline to preside upon the occasion": still less did he give no reason for his absence. Although Light was nearing his end—and he knew it—he had undertaken to complete the survey of the Port River for a syndicate: prior to Sturt's banquet he had been laid up with illness for several days, and feared that if he should return to Adelaide and large dinners, he would be laid up again, "and never complete his work": and that was the reason why he asked that another chairman should be appointed on the occasion. ([15])



The Buckinghamshire off Glenelg.
Painted by Col. Wm. Light.
(Courtesy Archives.)

In reply to the toast of his health Captain Sturt is said to have made "a most feeling and characteristic speech." He expressed the opinion that there was perhaps nothing that would contribute more to the prosperity of South Australia than the means of communication that had been thrown open thus early between it and New South Wales, rendering possible the easy introduction of livestock, whenever required. Nothing, he thought, would more conduce to prosperity in the infancy of a colony like South Australia, than close attention to livestock. Many settlers of limited means in New South Wales had withdrawn from society to tend their flocks and herds, until such time as the increase of the latter had enabled them to return to the city in comparative affluence. All that was required was the firmness necessary to submit to exile for a few years,

([14]) *South Australian Gazette and Colonial Register,* 8th September, 1838, page 3, col. 2.
([15]) *Southern Australian,* 15th September, 1838, page 3, col. 4; see also Appendix III. for full text of Light's letter.

and ordinary care and personal superintendence would ensure success. The other resources of the colony were not immediately available, but would develop gradually in the course of time: but pastoral pursuits were open to all, and they could not have a more fertile or more beautiful country in which to follow them. He also expressed his intention of proceeding to Encounter Bay to complete the survey which circumstances had prevented his doing when he was last on the coast. He deprecated the waste of public money at the time in attempts to render the Murray and the Hume navigable for the purpose of establishing inland water communication between South Australia and New South Wales: even if this were practicable there were no exports to justify the expenditure of so much money. Let their attention be directed to the solid improvement of the province: to useful buildings, to roads, to harbours, bridges, etc.: the returns would be slower, but they would be more certain in the long run than any other kind of expenditure. ([16])

Adelaide Water Supply, 1837. First Government House on Hill, approximately where City Baths now are.
Sketch by Mary Hindmarsh.
(Courtesy Archives.)

Unfortunately the episode of the *"country green slips"* did not redound to the credit of Acting Governor Stephen, nor indeed of anybody else who had the misfortune to play a part in it: not even if their actions in the matter had the sanction of the law, upon which Stephen was alleged to have staked his reputation "as a lawyer" ([17]) but concerning which there was ample room for differences of opinion. The fact was, that a question transcending the law was at stake, namely, one of ethics, of which the law usually took no cognisance: whether highly placed officials, and in particular, representatives of the sovereign, could be allowed to take advantage of their high office and inside information which it threw open to them, for the purposes of personal enrichment at the expense of the general public. Briefly stated, the relevant facts were as follows.

The Land Regulations of the Colonisation Commissioners had provided that for the satisfaction of the holders of Preliminary Land Orders—*i.e.*, Land Orders taken up in England prior to the official launching of the colony, and holders of which might be termed "foundation members" of the colony—surveyed land should be cut up into blocks 134 acres in area; and that when the Preliminary Purchasers had selected their blocks, the remaining blocks were to be cut up into 80-acre sections and thrown open to colonists generally. In

([16]) *South Australian Gazette and Colonial Register*, 15th September, 1838, page 3, col. 4.
([17]) *Southern Australian*, 20th October, 1838, page 2, col. 4.

dealing with district "A"—an area of about 150 square miles with Adelaide as its rough centre and the first to be completely surveyed by Light—the surveyors no doubt pressed for time, and anxious to make land available as rapidly as possible, adopted in most cases the simple expedient of lopping off 54 acres from a 134-acre block, which gave an 80-acre section, on the one hand, and what came to be known subsequently as a "country green slip" on the other; so called because on Light's original map these redundant areas of land were coloured in green, in order that there should be no misapprehension as to their nature. It was obvious, however, that occasionally other methods of subdivision must have been adopted, as all of the country green slips were not 54 acres in area.

The Resident Commissioner was evidently embarrassed by these "slips" of land of varying dimensions, interspersed amidst his legitimate 80-acre sections and 134-acre blocks: for the latter ample provision had been made in the Land Regulations, but none whatever for the "slips": and accordingly he fell back upon his favourite expedient of putting off the evil day, and withheld the slips from sale, pending further instructions from London. Kingston, who had his eye on some desirable "slips" for his own purposes, urged upon the Commissioner "the propriety of immediately offering them for sale": and argued that if the land in question had not hitherto been applied for it was because he (Kingston) had been instructed by the Commissioner to inform all applicants at his office that the land in question was not for sale: at the same time he was convinced from the number of persons he had seen who were desirous of obtaining the slips, that they would all be taken up in one day. (18) The Commissioner, however, demurred, and it was not therefore surprising that when later on he discovered that first G. S. Kingston, and next G. M. Stephen and Charles Sturt, had more or less surreptitiously tendered for the greater part of the "green slips," he should have informed the applicants that their tenders could not be received, and that the Treasurer had been instructed to return their deposits. (19) The legal position, which Stephen disputed, would therefore appear to have been somewhat as follows:—The "green slips" having been withheld from sale by the Resident Commissioner, the land in question became subject to the usual Land Regulation to the effect that "one month's public notice shall be given of the time when any portion of public lands will first become open for purchase": in other words, the "tenders to purchase" of Kingston, Stephen and Sturt, were illegal, inasmuch as the land for which they had tendered had not been officially declared open for purchase. (20)

On the 6th October, 1838, there appeared in the public press a "bomb-shell" in the form of an open letter addressed to "His Excellency the Acting-Governor and Captain Sturt" over the signature of E. H. Pollard. The letter went on to say that the writer having ascertained that they (Stephen and Sturt) had tendered for 18 slips of land, which with the exception of five slips previously tendered for by G. S. Kingston and others, comprised the whole of the unappropriated fragments (21) resulting from the division of the unselected Preliminary Sections, he (Pollard) wanted to know upon what ground their (Stephen and Sturt's) deposit with the Colonial Treasurer for these lands, which he (Pollard) considered altogether illegal, could entitle them to preference over the general and equal rights of the public. In a postscript Pollard had the grace to exonerate Sturt from blame, in the conviction that the latter's brief stay in the colony could not have enabled him to become acquainted with the full circumstances of the case. (22)

(18) G. S. Kingston to J. H. Fisher, 20th August, 1838.

(19) *South Australian Gazette and Colonial Register*, 13th October, 1838, page 3, col. 3.

(20) See Land Regulation in Appendix IV. at end of volume,

(21) The latter statement was incorrect; Stephen and Sturt's tender was said to cover 800 acres, having a "tender" value of £800; see *Southern Australian*, 3rd November, 1838, page 2, col. 4.

(22) *Southern Australian*, 6th October, 1838, page 3, col. 4.

Naturally Mann took up with great zest the campaign against Stephen and Kingston: and Stevenson, in the unaccustomed role of defender, endeavoured to bluster his way through with feeble logic, if strong invective. There could be no doubt whatever that from the standpoint of ethics that should govern service under the Crown, both Stephen and Kingston were grievously culpable: and that they were legally culpable too would seem to follow, since ultimately—31st October, 1839 (28)—Governor Gawler—ironically enough over the signature of Captain Sturt, at the time Assistant Resident Commissioner—informed the world that he had decided that the "green slips" in dispute "never had been thrown open to general selection, and that therefore no valid claim against them existed." And thus, after twelve months' wrangling was brought to a close an unedifying episode in the history of South Australian land settlement, and eventually the "country green slips" became available for more legitimate purposes.

Trinity Church, North Terrace. First stone laid by Governor Hindmarsh, January, 1838.

Sketch by S. T. Gill, 1845.

(Courtesy Archives.)

However much one might condemn G. S. Kingston for his treatment of Colonel Light, one could not refuse him due recognition for strenuous work against great odds during the four months of his control of the country surveys. He had started operations with the aid of three Assistant Surveyors: by the end of the first week, one of them had resigned; and eight weeks later he had to suspend another for incompetence, and for the balance of his precarious term of office, the Deputy-Surveyor had to complete his work with the help of a single trained assistant only. To take up field survey work adequately at the several points at which it had been left by the abrupt resignation of nine surveyors, and without assistance from any of the participants, was no easy task for any man—and Kingston was suspected of mathematical weaknesses—nevertheless the task had to be faced, and faced it was. Not only did Kingston get no assistance from his late colleagues, but throughout he was passively hampered by them: they dallied in supplying information essential to the completion of tasks which they had commenced: they were equally dilatory in the return of government instruments and survey material previously under their care: and when they were asked for their field-books, from the data of which had been built up the survey maps—books so obviously the property of government—they replied, as with one voice, that Kingston could come over and copy them, if he so desired, but that they proposed retaining possession of them for their own future justification, should an inquiry into the working of the Survey Department ever be made. And in addition, from time to time, Kingston's uneasy soul was made to writhe under the barbed shafts of Light's gentle irony, until in desperation he begged the Resident Commissioner "to withhold from him (Kingston) any letters of his (Light's) which are thus personally insulting. ([24]) Nevertheless, when the time came for him to shake off the Survey dust of his feet, and head erect, to go out into the wilderness, he was able to boast that in spite of all "he had marked out some 30,000 acres, and had put parties in possession of 40,000, leaving 5,000 ready for immediate occupation and selection." ([25]) A proud boast, but a just one, if we take into consideration almost complete lack of assistance, unconcealed public hostility, and many other difficulties of unusual nature: but unfortunately much of this work was subsequently said to have lacked accuracy; and had to be corrected by others in serener times of greater leisure and affluence. On this and other counts Kingston has been deemed an incompetent Surveyor: but whether such accusation were justified or not, should not concern us in the present instance; and common fairness and human consideration forbid that we should seek confirmation of them in Kingston's four months of purgatory, when almost single-handed, with the knowledge that almost every man's hand was against him, steadily and unflinchingly he met the supreme demand of those days, and prepared land for the landless, and progressively settled them thereon. Nor in the circumstances, did it seem right that we should look too closely into the meticulous accuracy of the surveys for which he was at that time responsible: the task of the day was to place men on the land with the greatest possible expedition: the less insistent problem of the niceties of precision could well be left to calmer times and possibly to more highly trained surveyors: but in circumstances that then existed it was highly questionable whether even the most competent surveyors in the world could have done more, or better, towards meeting the major demand for land, if indeed as well.

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(28) *South Australian Gazette*, 31st October, 1839, page 5, col. 2.

Stephen's short rule came to a close on a note of comedy in which he succeeded in bursting through the meshes in which his adversaries had thought to entangle him and left them gasping. On 25th October he was presented with a congratulatory address, expressed in the most flattering terms and signed by "the undersigned inhabitants of South Australia" who were represented by 230 signatures. He was praised for his conspicuous ability; for his liberality in relieving the Treasury from momentary embarrassment; for due maintenance of law and order in the province; for having won the confidence and respect of colonists generally and having "asserted the just dignity of a Governor of South Australia." To all of which Stephen replied with his usual modesty, claiming for himself no more than a "forbearing temper, a conciliatory disposition . . . and an integrity of purpose which had always in view the welfare of our noble province."—Had he already forgotten the "green slips"?—He also praised "the good conduct of the labouring classes" to which he attributed the " unexampled tranquility" that characterised his term of office. ([26])

But apparently some of the citizens were not prepared to give undiscriminating praise to the Stephen administration of Government: and six of them, headed by Charles Mann, and including the members of the Committee to whom Stephen early in his term of office had declined to reveal the secrets of Government finance, induced sixteen others, who had signed the original address, to join them in asking the Sheriff—C. C. Dutton—to call a public meeting "for the purpose of considering a mode of presenting the late Acting-Governor with a testimonial of public approbation": and the Sheriff readily took steps

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([24]) G. S. Kingston to J. H. Fisher, 30th July, 1838.
([25]) The land policy of South Australia, by W. Oldham, page 74.
([26]) *South Australian Gazette and Colonial Register,* 27th October, 1838, page 1, col. 2.

accordingly. ([27]) Curiously enough Charles Mann seems to have admitted that the signatures to this requisition "appeared by contrivance, as if they were a spontaneous tribute of respect for the admirable management of Mr. G. M. Stephen during his Acting Governorship; when in fact they were given for the purpose of obtaining an opportunity of expressing others, and in many respects diametrically opposite opinions." ([28]) Probably the names of Stephen's chief opponents affixed to such a requisition served to awaken the latter's suspicions: on consideration, he probably realised that at a public meeting of the kind, the Balaams who had been called to bless him would very likely turn round and curse him instead; and accordingly he wrote a note to the Sheriff requesting the latter "to advise the signatories and his other kind friends that he gratefully acknowledged their flattering intentions: but that having already received such gratifying expressions of public favour as were conveyed in the recent address signed by almost every colonist of consideration, he viewed with regret any such demands upon the liberality of his friends as the one contemplated: and he begged therefore that the meeting might be countermanded. ([29]) And again the Sheriff, much to the consternation of the six "contrivers" acceded to the request and called off the meeting. This might be described as Stephen's last triumph, as thereafter the "meteor" as we shall see later on, took a course with a distinctly earthward trend.

APPENDIX II.

Address of George Milner Stephen after taking the oaths of office as Acting Governor.

His Excellency the Acting Governor then made the following address:—

Gentlemen—Commanded, as I am, by His late Majesty's commission to "take upon myself" the temporary administration of the Government of this *experiment in colonisation*, I have before me no cheering prospect to contemplate.

Called upon to conduct the responsible duties of a high office which an able and gallant officer, who had fought all the naval battles of his country for the last half century, and been publicly applauded by the great *Nelson* for his gallantry and judgment; and who, possessing all that energy and uprightness which characterise his profession; and at the same time a devotion to the best interests of the colony, which it will be my desire to emulate—which, such a gentleman I say, has not succeeded in discharging to the satisfaction of the Board of Commissioners, entrusted with the carrying out of the principles upon which this colony is established, it would be presumptuous in me to anticipate their approbation. If, however, I shall succeed in allaying the feelings that are now rife in this community, and in restoring peace and harmony to our infant society, and at the same time protect it from the miseries, if not dangers, which seem to threaten it, my ambition will be amply satisfied.

That I can look forward to effecting little more than what I have enumerated during the short interval that my administration will last, you, gentlemen, will acknowledge when you shall reflect upon the state of public affairs at the moment I am addressing you; and I owe it to my own official character, now of ten years standing, to confess openly the position in which the colonial Government is now placed; that by boldly looking our affairs in the face you may be able the better to afford me the advice which I shall so much require, and shall at all times anxiously seek; and that by pointing out the difficulties which I have to encounter I may meet with sympathy should my exertions be attended with disappointment.

I have first to announce with regret that there are no funds whatever in the Treasury, and that the quarter's salaries due to the whole of the public servants on the 30th June last, are at this day unpaid. We have, therefore, to fear that the tempting remuneration held out for the exercise of ability in private undertakings in this province, added to the distress which they are beginning to experience from the want of money, will induce many indispensable public officers to leave the service of the Government.

Secondly: By the departure of the marines in H.M.S. *Alligator*, this province with a population exceeding 4,000 persons, is abandoned to the protection of 18 policemen, lately embodied by Governor Hindmarsh; while there are now 21 prisoners confined in the weather-boarded building used as a gaol. And perhaps double that number of desperate runaway convicts in the neighbourhood of the town.

([27]) *South Australian Gazette and Colonial Register*, 3rd November, 1838, page 1, col. 3.

([28]) *Southern Australian*, 10th November, 1838, page 2, col. 3.

([29]) *South Australian Gazette and Colonial Register*, 3rd November, 1838, page 1, col. 3.

At the same time, as I have observed, there are no funds for the support of the Force now constituting our only protection; and the Resident Commissioner is restricted by his instructions from providing money for such purpose. And, although our critical circumstances would seem to warrant the course, I shall scarcely dare to take upon myself the responsibility of drawing upon the Lords of Her Majesty's Treasury for their maintenance, unless the general voice of the community shall require it.

We have, happily, no immediate cause to apprehend hostility from the aborigines, or our situation would indeed be deplorable; but they have ere now sacrificed two fellow creatures: and you have too recently witnessed the outrages that terminated in a public execution to regard with indifference our present unprotected state. And though it gives me pain to set such a picture before the many private gentlemen now present, who have embarked their fortunes in this land, in the just expectation that the Government would afford themselves and their families the protection which they have perhaps already paid for, I ought not to conceal from them our extraordinary condition, I will, however, earnestly assure you all, gentlemen, that should you become apprehensive of danger from the want of the sinews of Government—finances—I will unhesitatingly submit to the Council the propriety of departing from the Royal instructions in providing them.

Thirdly: It may be necessary for my future justification to allude to the embarrassed state of the Survey Department, occasioned by the recently received instructions. The Government, I am fully aware, exercises no authority over the Land Department; nor is it charged with the responsibility of the surveys. As it is, however, incidentally affected by the state of that department, I may be pardoned for referring to it; especially as the want of land may increase your disquietude and have a tendency to add to the cares of the administration which has just devolved upon me.

Gentlemen, you are probably too much interested to feel fatigued with this address; but I must apologise for having so long taxed your patience. It was essential to my interests that I should detail the difficulties of my situation, and it now becomes my duty to pledge myself and the other members of the Council that our utmost exertions shall not be spared in preserving the efficiency of the Government.

For all our present embarrassment it is certain that Governor Hindmarsh is not, and I believe that no one else in this colony is answerable; and it is proper that I should remind you that neither is Her Majesty's Government responsible for it.

Finally, gentlemen, I look to your kind assistance and beneficial example for assisting myself and the Council in administering the Government and preserving good order in the community. And when I resign the Government into abler hands, believe me, gentlemen, that I shall feel proud in being regarded—though *now* out of court—as the *Amicus Curiae* of the Province!

I must now take leave of you, gentlemen, for the purpose of attending to important duties in the Council; and I beg to express my acknowledgements for the respect that you have evinced for the constituted authorities in favouring me with your presence upon this occasion.

I regret that the Resident Commissioner, at such a moment as the present, has not afforded me the support of his presence, which, as the representative of my Sovereign, I perhaps had a right to expect; but I presume that more important avocations are now engaging his attention.

[From the *South Australian Gazette and Colonial Register* of 21st July, 1838, page 1, cols. 1 and 2.]

APPENDIX III.

Letter from Colonel William Light, former Surveyor-General, explaining his inability to attend the public dinner given to Captain Sturt.

My dear Finniss—I hasten to answer your note, and to request some other Chairman may be appointed. It is not out of disregard to Captain Sturt's merits and enterprise that I wish to be absent. No one more fully appreciates them than I do, and no one has more reason to acknowledge himself indebted to Captain Sturt than I have. It was through his account of the Murray, his conceptions of the country between St. Vincent's Gulf and the Murray, that first led my views so strongly this way. I am now fully engaged in my survey, and as soon as I get my first point established here I shall get on I hope fast; the first is always the slowest with me. My health was so very bad the first three days that I was in great dread of being obliged to relinquish my task. I have persevered, and got over it, and I now find myself getting better; and the sea-breeze will soon enable me to finish my survey, I hope to the satisfaction of my employers. If I return to Adelaide, to large dinners, etc., I fear I should be again laid up and never complete my work, and this is the true reason of my wishing to be absent.—My kind regards to all.

Yours very sincerely,

3rd September, 1838. WILLIAM LIGHT.

[Taken from the *Southern Australian*, 15th September, 1838, page 3, col. 4.]

APPENDIX IV.

Regulations for the Disposal of Land in the Colony.

27th Article.—The Surveys of public lands shall, as far as possible, be carried so much in advance of settled districts, that there shall at all times be an extent of land surveyed and open to purchase exceeding the wants of the colonists.

The object of this Regulation is to secure to intending purchasers at all times the most complete appropriation, with respect both to the quantity and the situation of land which they may desire to obtain.

28th Article.—Surveyed lands shall be divided as nearly as may be, into sections of 80 acres each, with the exception of the site of the first town, which shall be divided into 1-acre sections (see Article 33); maps of the surveyed lands, accompanied by the best practicable description of them shall be constantly exhibited in the Land Office.

The object of this Regulation is to enable intending purchasers to specify accurately the situation and quantity of land which they may desire to obtain.

29th Article.—Except during six months from and after the landing of the Colonial Commissioner, one month's public notice shall be given of the time when any portion of public lands will first become open to purchase. During those six months, one week's notice shall be sufficient.

The object of this Regulation is to provide for equality amongst intending purchasers with respect to the selection of land, so that none may gain an advantage over any other, by applying for land until all shall have had time to examine the district laid open to purchase. The object of the exception for the first six months, is to avoid such difficulties as could not but arise, if, while the surveys had not yet proceeded beyond the wants of intending purchasers, a longer notice than one week were required.

30th Article.—On some fixed day of every week, and at some fixed hour, the Land Office shall be opened for the purpose of deciding upon applications for land. All applications must be made by sealed tender; by filling up a printed form which will be supplied at the Land Office. Each tender must specify, by reference to the map, the section or sections for which the intending purchaser applies. All sections included in the tender must adjoin each other. All tenders will be opened in public, and those received on the same day will be opened at the same time. Such tenders as do not comprise any section included in any other tender shall be first disposed of.

When the same section, or sections, shall be named in two or more tenders, comprising equal quantities of land, then the tender to be preferred shall be decided by lot. Anyone holding one or more Land Orders under the preliminary sales, and wishing to delay his right of selection as regards the rural land, may do so, on condition that the selection when made shall be in conformity in all respects with the Regulations at such time in force; the party being considered as having paid for the quantity of land contained in his Order or Orders, and not previously claimed; but in all other respects, being placed on an exact equality with the parties then purchasing.

The quantity of land required to complete an integral number of sections to be paid for at the price of the day.

The object of this Regulation is to render the mode in which land is disposed of perfectly fair as between all intending purchasers. By means of the tender, an intending purchaser will be secured against unfair competition from other persons, who, if the application were verbally made public, might try to obtain the same land merely because it was known that the first applicant had taken trouble in the selection.

It is required that all sections included in the same tender shall adjoin each other, in order to prevent as much as possible, obstacles arising to the after-purchase of large unbroken blocks of land. It is not intended, however, to prevent distinct applications from the same party for sections not adjoining.

In giving the preference to those tenders which comprise the greatest quantity of land, the Commissioners only carry into effect a main purpose of the South Australian Act, which is that there shall be no limit or check to the appropriation of land, but that the greatest quantity applied for shall be immediately sold.

31st Article.—The sole condition of purchase shall be the payment of money, at the rate of £1 sterling per acre: and nothing, whether above or below the surface of the land, will be reserved by the Crown. Five per cent. on the amount of the purchase money shall be deposited at the time of making the tender, and the remainder shall be paid within one week of the sale. If the remainder of the purchase money be not paid within the time specified, the land shall be again open to purchase and the deposit shall be forfeited.

The determination of the price of land is the most difficult duty the Commissioners have to perform, and it is at the same time the most important, for upon the correctness of that determination must depend the sufficiency or insufficiency of the supply of labour, and the extent to which it can be combined, and thus rendered efficient. Experience alone will enable the Commissioners correctly to ascertain the proper price of land, and in the meantime it has been thought desirable to place the price too low than too high, as a future advance will be injurious to no one.

32*nd Article.*—The period during which £1 per acre shall be the price of public land is one year from and after the 1st March, 1836, and after that period the price will be raised if it should be deemed expedient.

In the event of there appearing any tendency to injurious dispersion among the colonists, the Colonial Commissioner will have authority, after the expiration of three months from the date of the first sales in the colony, to raise the price of land to any sum not exceeding £2.

33*rd Article.*—The lands comprised within the site of the first town will be divided into 1,000 sections of one acre each, and with the exception of 437 sections already disposed of, will be put up to auction, one section at a time, at the upset price of £1.

34*th Article.*—Leases of pasturage of unsold land shall be granted on the following conditions, among others:—The term to be three years, the tenant having a right of renewal in preference to any other applicant.

Cultivation of the soil and the felling of timber to be disallowed. The land, or any portion of it, to be liable to sale, and if sold, the lease to terminate on a notice of two months, the tenant having a right of renewal to unsold portions.

The yearly rent to be ten shillings sterling per square mile to proprietors of land in the colony (each being restricted to one square mile of pasturage for every 40 acres of land he may possess) and forty shillings sterling per square mile to non-proprietors, or to proprietors for any quantity exceeding the stated allowance. No lease to contain any fractional part of a square mile of pasturage.

The object of this Regulation is to afford the greatest facilities for the growing of wool and rearing of livestock. By the low price of pasturage one facility will be provided for a mode of production which has been successful in the neighbouring settlements of New South Wales and Van Diemen's Land; while the price of £1 per acre for land in possession, will provide another facility, namely, shepherds not being convicts but persons brought up to the management of sheep and cattle. The cheapness of pasturage would be of little use without a constant and ample supply of pastoral labour.

35*th Article.*—Anyone who shall hereafter pay in advance to the proper officer, either in England or in the colony, the price of 4,000 acres of land, or upwards, shall have a right for every 4,000 acres thus paid for, to call on the Colonial Commissioner to direct the survey of any compact district within the colony, of an extent not exceeding 15,000 acres; and within 14 days after the publication of such surveys at the Land Office, to select his land from any part of such district before any other applicant. If two parties should apply at the same time for the same survey, the decision between them shall be according to rule given in the 30th Article.

36*th Article.*—An accurate statement of all purchases of land made and leases of pasturage granted, specifying the quantity and situation in each case, and the name of the purchaser or tenant, shall be published from time to time in the *Colonial Gazette.*

[Taken from "General Information concerning the Colony, etc." in Appendix No. 4 of the First Annual Report of the Colonisation Commissioners of South Australia.]

(*To be continued.*)

Dehorning Cattle.

In company with the Premier (Hon. R. L. Butler), the Agent-General and Trade Commissioner (Mr. C. F. G. McCann) visited one of the largest farms in Denmark where there was a herd of 185 dairy cows. All calves, for the last 30 years had been dehorned at four weeks of age. The stubs had been burnt out with acid and so skilfully had it been done that no mark was left on the head. The visitors were informed by the manager that experience proved that dehorning did much to make cattle contented and that they fed without fear and put on condition much more rapidly than if the horns had been left on.

Wireless Talks

On 28th June, Mr. W. J. Spafford (Director of Agriculture) gave the inaugural address of a new series of Wireless Broadcasting Talks over Station 5CK of the Australian Broadcasting Commission. This series will be given at 9 p.m. on Monday and Wednesday of each week, officers of the Department of Agriculture and associated Departments contributing to the Monday night programmes.

Mr. Spafford's address is quoted below.

It is my pleasure to inaugurate the Countrymen's Session which is to be introduced by the 5CK Section of the Australian Broadcasting Commission.

The new Manager of this section—Col. L. R. Thomas—believing as he does that South Australia is largely an agricultural State, is satisfied that special consideration should be given to those country people desiring to keep themselves abreast of the times, and so he intends to conduct special sessions every Monday and Wednesday evening, under the direction of Mr. L. Langsford. The Department of Agriculture is in full accord with the ideas of Col. Thomas on this matter, and its officers are so convinced that much good will follow the regular dissemination of agricultural information over the air, that they are prepared to do all they can to help make a success of the venture, and so have readily agreed to co-operate with the management. Every Monday evening an officer of the Department of Agriculture will give a talk on the phase of agricultural activity in which he specialises, and by this means we hope to help popularise this Countrymen's Session.

The Department of Agriculture is maintained for the purpose of increasing the quantity and improving the quality of the agricultural products of the State, and to carry out the work is subdivided into several branches, covering advisory and educational, research, administrative, inspectorial and social activities.

In this country of ours it has been acknowledged for a considerable time that the surest and quickest manner of promoting progress in agricultural activities is to recognise the fact that there are no secrets in agriculture, and while rural producers remember this, and frankly and fearlessly discuss with one another their successes and failures, continued progress will be made, and both individuals and the State will reap much benefit. We are very fortunate in South Australia that an Agricultural Mutual Benefit Society, known here as the Agricultural Bureau, was founded about 50 years ago, and now has some 360 branches scattered throughout the length and breadth of the State. The branches of the Agricultural Bureau meet once a month to discuss any matter affecting the welfare of the members, except religion and party politics, and besides conducting meetings amongst themselves, have visits from officers of the Department of Agriculture and other organisations, who deliver addresses and enter into the discussions which follow. This wonderful improvement society has played a very great part in the agricultural progress of the State, and has also filled a social need of communities widely separated from other communities, in our outback country districts. The Agricultural Bureau has never been more active and vigorous than at the present time, and all rural dwellers domiciled at a convenient distance from a meeting place of a branch of the organisation, should become active members, because there is much to be learned by all.

Although we are very proud of the Agricultural Bureau system, which originated in South Australia and has been copied by other peoples, and look upon it as our principal means of disseminating information amongst rural producers, our other methods of helping the education of agriculturists include the Roseworthy Agricultural College Course, Advisers in

Agriculture, Dairying and Horticulture resident in country centres, Agricultural Experts of various kinds located at Adelaide, and the monthly publication of our *Journal of Agriculture.*

Time does not permit of a detailed statement of the Roseworthy Agricultural College Course, but every effort is made to provide a thoroughly theoretical and practical education in South Australian agricultural principles and practices. Besides the ordinary agricultural course of education, last year a special and very thorough course in viticulture and wine-making was introduced at the College, so that students can be trained in grape-growing and wine-making in the principal wine-making State of the Commonwealth, instead of being compelled to go to Europe to complete their education in these matters. Details of the Roseworthy College Course will be posted to anyone requesting the same from the Principal of the College (Dr. A. R. Callaghan), or from the Department of Agriculture.

Agricultural, Dairying and Horticultural Advisers are resident in various country towns, and have defined districts in which to operate with the object of improving the agricultural production. Their principal line of attack is to visit producers on their holdings, discussing their problems on the spot, giving what advice they can, and helping each individual in any way that is possible. Besides the farm-to-farm visits, the District Advisers deliver lectures to branches of the Agricultural Bureau, public meetings and schools, give demonstrations in agricultural practices, judge agricultural competitions, and adjudicate at agricultural Shows.

The heads of the various branches of the Department of Agriculture, including the poultry section, are located in Adelaide, and are available to help anyone desiring their services, and can be approached by personal visit, letter or telephone.

The South Australian *Journal of Agriculture,* which is published monthly, is recognised as one of the good agricultural periodicals of Australia, and since its form was changed and the type of article published was altered some few months ago, it is still more attractive than previously. This Journal is available to members of the Agricultural Bureau at 2s. per annum, to other South Australian residents at 5s. per annum, and others at 10s. per annum.

Besides providing help direct from the Department of Agriculture, arrangements have been made whereby assistance can be procured by the Department, from Wool-classers of the School of Mines, from the Department of Chemistry for analysing soils, waters, foodstuffs and locally-found earthy materials, from the Waite Agricultural Research Institute in connection with plants, insects, plant diseases and pests, and other agricultural matters, and from the Stock and Brands Department for diseases of livestock.

Research work undertaken by the Department consists in the main of work in the field, and much of it has to do with crops such as the cereals, pastures, fruits, and tobacco, although some is connected with livestock, including poultry. Two experimental farms and three orchards are maintained by the Department, but the bulk of the work being done is conducted on private holdings in association with the owners.

To summarise briefly the position, the Department of Agriculture is maintained for the benefit of rural producers, and its officers recognising this fact know that they are always at the disposal of such of the producers as desire their assistance. The address of the Department of Agriculture is Adelaide, there is no need to include the name of the street, and any communication delivered in person, by letter, telegram or telephone will receive attention, and as promptly as is possible. Not only do we know that we are employed to help the agricultural production of the country, but we have a strong desire to do so, and the more requests for assistance received by us the better we will be pleased. Because of this we welcome the introduction of the Countrymen's Session, and thank the management of Station 5CK for the opportunity to assist, and sincerely hope its inclusion in the programme will prove a huge success.

The Recovery of Wheat Prices and some Agricultural Reflections Thereon

[By ALLAN R. CALLAGHAN, D.Phil., B.Sc. (Oxon.); B.Sc.Agr. (Syd.), Principal, Roseworthy Agricultural College.]

Introduction.

Substantial recovery of wheat values has presented a new and much brighter economic horizon to the cereal growers of Australia. To no State in the Commonwealth does the improvement mean so much as to South Australia. Large tracts of our country are eminently suited to wheat culture, and may be classed essentially in the category of single-crop lands.

It being impossible for agricultural reasons to grow other crops, the farmer in such countries is compelled to grow wheat in spite of low prices. The fact that farmers continued wheat growing even when costs of production exceeded the prices obtained, was no fault of theirs, it was agriculturally impossible to do otherwise. Undoubtedly the long period of low prices forced farmers to exploit other avenues, but taken in a broad way wheat remained the basic crop.

Emergence from the disastrously low prices has placed the industry again in a sound position, enthusiasm has been restored, and the farming community has been revitalised.

To the State, the recovery is a matter of considerable moment, and to every farmer it has come as a heartening relief from the almost hopeless position which developed after the collapse of world prices in 1930. Every farmer seeks to know the prospects of a continuance of payable prices. Scraps of information appear in the press daily and the market advances or declines accordingly; it is difficult, however, from such reports to obtain a general or long range view of the situation. In the hope of clarifying the position a brief analysis of the world wheat position is attempted in the following review.

High wheat prices will naturally alter the outlook of every individual farmer, and agricultural repercussions are sure to follow. For this reason the likely agricultural developments consequent of high grain prices are also considered herein, with the object of tempering wheat growing enthusiasm with sound agricultural procedure. It is a case of mixing agricultural economics with agricultural advice, but in this case the two are vitally linked, and it is greatly to be desired that the agricultural excesses of the past, which were the sequel of a period of high wheat prices, should be avoided as far as possible in the future.

The World Wheat Position.

The leading feature of the 1936 wheat season was the progressive advance in wheat prices. For the first time since 1928 the wheat market of the world regained its position of equilibrium.

The period 1928 to 1933 was one of great world wheat production, and above average crops, over the whole six years, coincided with a restricted demand due to world economic depression, and with the progressive adoption, on the part of large importing countries, of a policy of economic self-sufficiency. A heavy accumulation of unsold stocks resulted and the carry-over of wheat from year to year meant a compounding of surpluses until the exporting countries found themselves embarrassed beyond all hopes of market equilibrium. This led the Wheat Commission to report that "the sudden collapse and the subsequent persistently low world price for wheat was directly due to the unrelieved pressure year after year of an enormous surplus which world markets failed to absorb."[1] (See footnote.)

It would be erroneous to saddle the economic depression with all the blame for this enormous accumulation of wheat stocks. Fundamentally world wheat production greatly exceeded the demand, a position not altogether due to increased acreage but very largely because of particularly favourable cropping conditions which gave substantial world crops, all above average, during the period 1928 to 1933.

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[1] "Royal Commission on the Wheat and Bread Industries," Second Report, 1935, p. 17 (paragraph 21).

The 1928 season was especially bountiful when the world wheat harvest was over 500,000,000 bushels in excess of the annual average production for the previous five year period. This huge quantity of wheat naturally had its effect on the tone of the markets, but no relief was forthcoming because world production was high in subsequent years. The effects of unsold stocks was just being felt when the market was more hopelessly depressed by the general fall of commodity prices with the onset of the depression. The position was seriously aggravated by rapidly declining demand for wheat by the importing countries, largely because of increased wheat production on their part sponsored by their individual policies of economic self-sufficiency. Such policies were rigorously adopted by three of the largest importing countries, namely Germany, Italy and France. The following statement taken from a review of the world agricultural situation by the International Institute of Agriculture at Rome, defines this aspect of the position clearly. "Europe, instead of demanding ever-increasing quantities of food stuffs and raw materials . . . has been endeavouring, behind a bulwark of tariffs and restrictions, to become agriculturally self-supporting or, at least, to reduce as far as possible its imports of first necessaries."[2] (See footnote.)

As the policies became effective this trend towards self-sufficiency, artificially born and nurtured, led to a serious contraction of demand, which reached its full force in 1934-5 when actually Germany, France, and Italy became, to all intents and purposes, wholly self-sufficient as far as wheat requirements were concerned.

To understand the phenomenal recovery of wheat prices which marked the marketing season of the last twelve months, and to anticipate next season's markets, a review of the present position of the three factors referred to above is necessary.

Dealing firstly with the accumulated mass of unsold stocks; these no longer exist due partly to a succession of poor harvests, and partly to a general reduction in acreage, especially in exporting countries. The unfavourable world wheat season of 1934, marked the first definite turn in the succession of good seasons experienced from 1928 to 1933. North America had an exceptionally dry spring, especially in the United States of America, dry conditions reduced the Australian crop, and Indian wheat yields were reduced as a result of dry conditions followed by frost. Added to this was the all round reduction of acreage in exporting countries which had taken place, partly due to natural reaction following low prices, and partly due to an agreement to restrict their production within definite quota limits in accordance with international conferences held during the depression. The net result of these factors was that 1934 world production was small, and the exportable surplus available from the actual 1934 crop was insufficient to cover world demand and according to the International Institute of Agriculture "40 per cent. of the import demand in 1934-5 was covered by drawing upon stocks accumulated in the course of previous years."[3] (See footnote.) During this year the United States of America virtually ceased to export and left Canada, Argentina and Australia to cope with the import demands. In spite of this, accumulated stocks remained above normal requirements, very little confidence was gained, and the market did not respond in keeping with the trend of events. Fortunately there has, since then, been a progressive diminution of world stocks, and while recovery may have been unduly delayed, the position now is such that the seller has been reinstated as an active agent in the market, and because of this the buyer has been compelled to pay a price conforming with the present state of supply and demand. The market balance has again been adjusted and is no longer weighted down with the enormous burden of carry-over stocks.

To illustrate this point a graph compounded from the end-of-season wheat reserves in the three leading wheat exporting countries for the seasons 1925 to 1937 is given herein. The particularly healthy state of the estimated end-of-season reserves for 1937 is well shown in comparison with those of recent years.

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[2] "The World Agricultural Situation in 1934-5," International Institute of Agriculture, Rome, 1936, p. 9.

[3] *Ibid.*, p. 57.

The following figures taken from George Broomhall's *Corn Trade News* for 1st February, 1937, form the basis for the graph below.

END-OF-SEASON WHEAT RESERVES IN CANADA, ARGENTINA, AND AUSTRALIA.

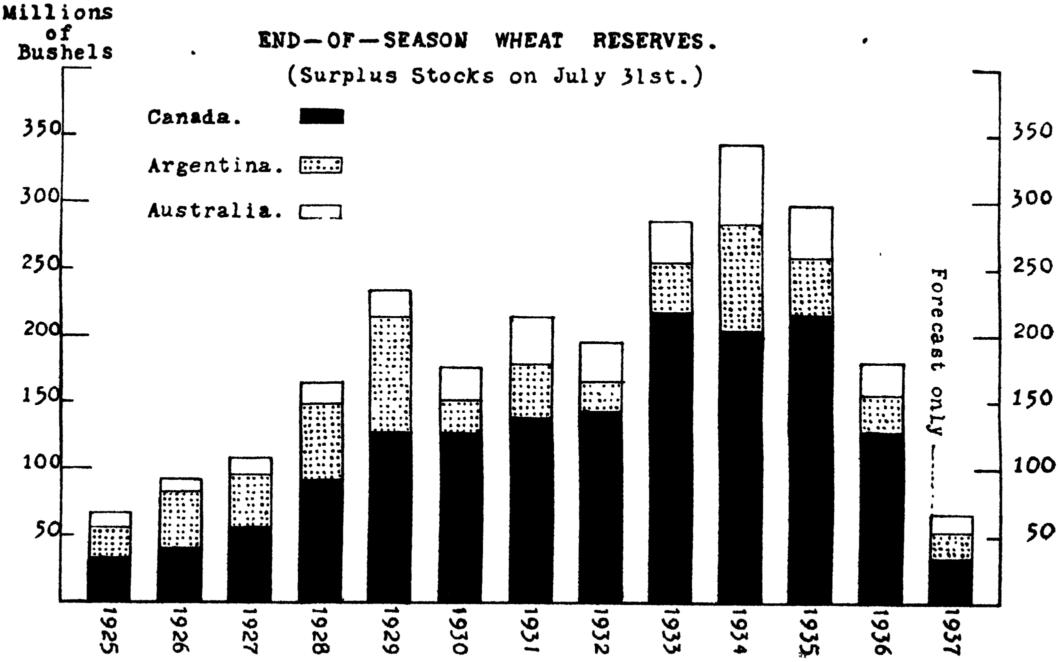
(SURPLUS STOCKS ON 31ST JULY.)

	Canada.	Argentine.	Australia.	Totals.
	Bushels.	Bushels.	Bushels.	Bushels.
1925	32,000,000	24,000,000	12,000,000	68,000,000
1926	40,000,000	44,000,000	8,000,000	92,000,000
1927	56,000,000	40,000,000	12,000,000	108,000,000
1928	92,000,000	56,000,000	17,600,000	165,600,000
1929	127,200,000	88,000,000	20,000,000	235,200,000
1930	127,200,000	24,000,000	25,600,000	176,800,000
1931	139,000,000	40,000,000	36,000,000	215,000,000
1932	143,200,000	24,000,000	30,400,000	197,600,000
1933	219,200,000	36,000,000	32,000,000	287,200,000
1934	204,000,000	80,000,000	60,000,000	344,000,000
1935	216,000,000	43,200,000	40,000,000	299,200,000
1936	128,000,000	28,000,000	24,000,000	180,000,000
1937	32,000,000	20,000,000	16,000,000	68,000,000

(Figures for 1937 are forecasts only.)

The statistical position, therefore, may be said to be very sound and there is no question that the delicate equilibrium of the wheat market has been restored and that it will respond for some time according to supply and demand.

The second consideration is to indicate the results of the campaigns of home production practised by European countries in their application of economic self-suffi-



Graph showing the heavy accumulation of unsold wheat stocks in the three main exporting countries of the world during the period 1928 to 1935, and the phenomenal recovery to normal dimensions in the last 12 months.

ciency. The significant feature is that the favourable world wheat position at present ruling has been attained in spite of the policy of self-sufficiency, which has been rigorously followed by countries formerly regarded as large wheat importers. The trend at the end of 1936 and beginning of this year has been a steady improvement in imports to continental countries in comparison with the same period for recent years. Germany and Italy have been quite prominent on the market, and a shortage in Spain due to civil war has meant a flow of wheat in that direction. In the light of this activity the following, quoted from George Broomhall's *Corn Trade News* for January 9th, is of particular interest and worthy of careful consideration. "Germany's wheat purchases have attracted renewed attention to the supply position in that country. The *Times* Berlin correspondent again asserts that there is sufficient native wheat and rye to secure the country's bread supply, provided these grains are not fed to animals. It is our opinion, however, that a scarcity does, in fact, exist. The probability is that bread consumption has increased considerably on account of the scarcity of meats and fats. The Government has deemed it expedient to tighten regulations covering growers' quotas and it is understood that farmers will be called upon to deliver larger quantities of wheat and rye than previously decided on, provided, of course, that additional supplies are still in their barns. This breakdown in the quota system can possibly be explained by an increase in the consumptive demand for bread." The fact of the matter is that wheat has been purchased by the European countries on a rising market which must have some significance. Furthermore, there has been a decided disinclination on the part of Italy to make available import and native harvest figures. It would seem that purchases by Germany have been activated by shortage, and that Italian purchases have been partially for Spain and partially for home consumption, yet both countries may be building up reserves to meet a possible international emergency. It does appear, however, that the 1937-38 season will witness activity on the part of countries anxious to acquire safety reserves and this is an added reason to suppose that the demand will be maintained.

The third consideration is that trade generally has shown marked recovery and there has been a general upward tendency in the price of primary commodities. In other words, the despondent tone on the markets due to general economic depression has very largely disappeared and both purchasing power and bread consumption should show steady increase.

In resumé, therefore, it would appear that the prospects of a good market for the 1937-38 season are particularly sound in that (*a*) the statistical position is better than it has been since 1928, and that any extensive crop failure may now lead to actual world shortage; (*b*) The policy of economic self-sufficiency has reached saturation point with evidence that it is most unlikely to affect adversely the wheat markets of 1937-38, and (*c*) the general recovery of commodity prices has meant a reinvigoration of trade and removed another despondent feature from the wheat market.

In addition to these major factors which have affected the market since 1928, there are two other influences which are worthy of mention. The Russian position remains indefinite, and reliable information is unavailable. Excessive Russian production could conceivably affect the world wheat position, but there is reason to suppose that the U.S.S.R. will not have any appreciable surplus for export in the near future. Such a surmise is based on current reports from Russia, with respect to the general economic and social conditions prevailing.

The United States of America presents the other factor, and for some time now, in fact since 1934, the United States of America has not been a very potent force on the export market. This is very largely attributed to the alarming proportions assumed there by soil erosion, due to both wind and water, in recent years. There can be little doubt that the general grain returns, chiefly maize and wheat, have been seriously reduced through the agencies of erosion, in fact so serious have been the consequences that it appears to be highly improbable that the United States of America will ever again attain her former prestige as the leading wheat exporting country of the world.

Possible Agricultural Outcome of High Wheat Values.

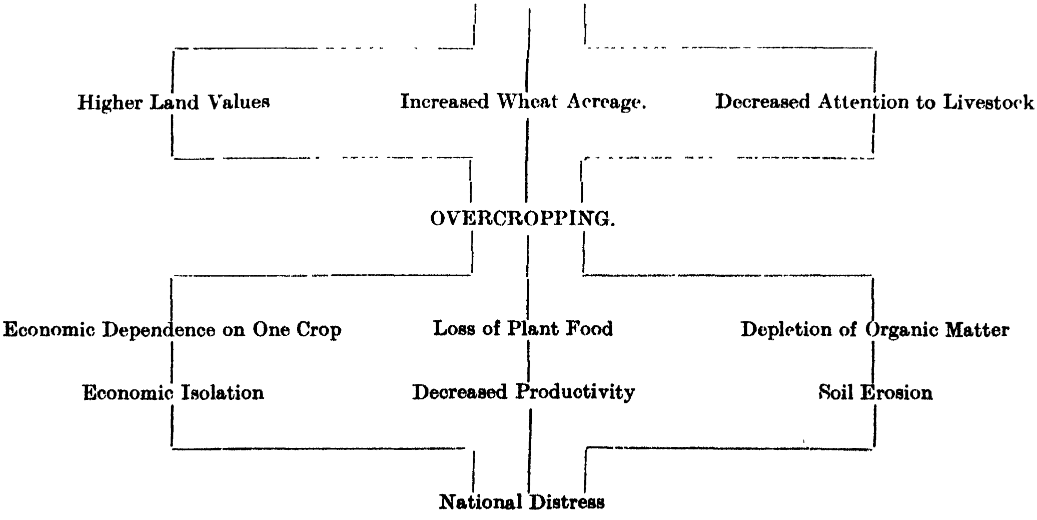
While rejoicing wholeheartedly with the farmer in the complete recovery of wheat prices, one is forced, as an agriculturist, to contemplate with a certain amount of misgiving certain practical trends which are likely to assert themselves, unless sane, steady thinking lends temperance to the rash exhilaration of ready cash and bright prospects. Not for one moment is it suggested that the higher wheat values now obtaining are not other than extremely desirable; the economic advantages are enormous, both to the individual and to the State. It is not my province, however, to analyse the general economic benefits which are the logical outcome of the new prices. On the other hand, that there is grave need of caution at such a time must be admitted, for the agricultural implications of high prices may quite conceivably cancel out in time much of the benefit from high prices unless such implications are carefuly watched and avoided as far as possible.

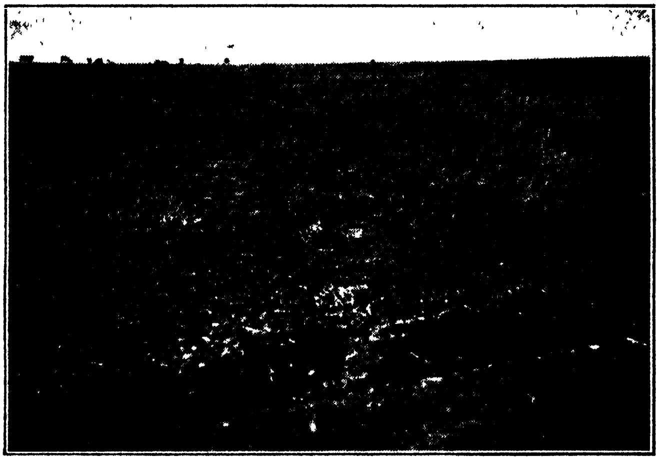
Agriculturally, three main developments may be anticipated. The first and obvious sequence to increased price is increased cropping, and this is likely to be felt immediately in that increased acreage will be devoted to wheat in the current season.

As a natural corollary to this there will be less attention devoted to livestock. Sheep, especially fat-lamb breeding flocks, in recent years have become increasingly popular; their presence on the farm meant that provision had to be made for their sustenance and accordingly less of the farm was devoted to wheat growing. Some farmers, especially those who were unfamiliar with, and never very enthralled by, sheep husbandry, will decide to return to more wheat and reduce their sideline interests accordingly. All side-lines will probably suffer similar reduction. Incidentally, tractors are likely to supersede horses on many farms. The result of this diminution of interest in livestock will mean that greater areas will be devoted to wheat, and greater quantities of plant food will be removed in the form of bagged produce.

The third consideration involves land values; if high wheat values can be anticipated with confidence higher prices for land will be asked. The higher land values become, the more intensive must the land be farmed. Many men are forced to overcrop their farms, in spite of their better judgment, simply because they have had to pay too much for their property, or because the price of land prevented them from purchasing a sufficiently large area on which to apply proper farming principles. There can be no more ruinous development than the soaring of land values, and every endeavour should be made, as it is confidently expected they will be, by financial interests to prevent a recurrence of excessively high land prices. Land values should be esti-

POSSIBLE OUTCOME OF HIGH WHEAT VALUES.





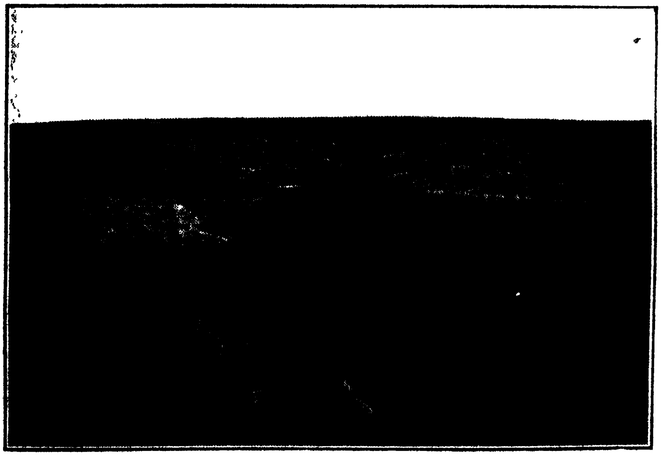
mated on a long term productivity basis and not, as they most frequently are, especially when conditions are favourable to the seller, on ruling commodity prices.

It will be seen, therefore, that apart from direct increase in acreage, the factors of high land values and decreased attention to livestock, ultimately involve increased cropping. The sequel is that overcropping will increase, and if there is any enemy No. 1 in South Australia at the moment, it is the isidious practice of overcropping. This should be avoided at all cost, and with the risk of assuming the mantle of Job, and becoming the complete pessimist, I intend, briefly, to show how this factor may operate to the detriment of South Australian prosperity, unless due attention is devoted to its avoidance.

The Menace of Overcropping.

The maintenance of soil fertility entails the adoption of a credit and debit account with respect to mineral plant foods and soil organic matter. Cropping involves a drain on plant food resources in that the whole of the produce containing the nutrients necessary for the production of the crop are taken from the paddock. Fallowing for the crop involves the change of organic matter into available nitrogen, and a well fallowed area provides ideal conditions for soil organisms to change the organic matter of the soil into an available condition for plant use.

It will be seen, therefore, that fallowing, and cropping, must reduce both available plant foods and organic matter considerably. Both losses involve decreased fertility and this, in turn, has two serious consequences, namely, reduced pro-



Three illustrations taken this year in South Australia, typifying three stages of water erosion on undulating wheat lands, which represents one of the most serious consequences of overcropping.

ductivity due to the decrease in available plant food, and soil erosion due to the depletion of soil organic matter.

It is not generally understood that the sudden onset of water erosion in our wheat lands is the result of too frequent cropping of the land, which leads to a diminution of organic matter. The more exacting the cropping programme the sooner the soil loses its organic matrix. Without organic matter the soil is bereft of its most important physical properties, chief of which, for the purposes of the present discussion. are its water absorbing and water retaining powers. A soil, rich in organic matter, has the physical characteristics of a sponge, in that it is able readily to absorb and retain large quantities of water. A soil, dedeficient in organic matter, has neither the absorptive, nor the retentive, powers necessary to cope with heavy rains and the result is that surface run-off is imperative. This leads to gullying, and, in some cases, to sheet erosion, whereby the whole of the surface soil is washed away.

While much attention of late has been directed to the soil erosion problem, chief emphasis, as far as this State is concerned, has been devoted to wind erosion. Yet, more insidious and disguised in its onset, and more serious in its consequences, is the problem of water erosion. Evidence is by no means lacking, in large tracts of some of the best wheat lands in the State, that the soils have lost their water absorbing and holding capacities and are about to give up the unequal struggle against injudicious cropping and succumb to the devastation of water erosion.

The Need for Diversification of Interests.

It is possible to save these lands, even at this late hour, by adopting a proper system of husbandry, and the same system will prevent serious consequences of overcropping, such as reduced production, and economic dependence upon one crop. There can be no question that over a period of years, even where the three-course rotational system, wheat, pasture, fallow, has been adopted for some time, the effects are recorded in depressed yields. To a large extent, loss of productivity on the part of the soil has been made good by the progressive introduction of better varieties, but the net result is that the land is declining in fertility. Any system of agriculture, which leads to gradual decline in fertility, must ultimately lead to failure.

All the time this most pernicious system of cropping regularly and too often is in progress the country is economically dependent practically on the one crop. This, admittedly, is largely unavoidable, but it can be greatly alleviated by increased attention to the products of livestock. The depression and exceedingly low wheat prices of the last few years forced some farmers into livestock activities. Others, through lack of this alternative occupation, were forced by pressure of circumstances to continue to grow wheat on an uneconomic basis. In a single-crop region, like the South Australian wheat belt, it is both agriculturally and economically desirable to make farming as diversified as possible.

The maintenance of soil fertility, and prevention of all the dire consequences outlined above, entails the adoption of many practices not sufficiently well recognised by the individual farmer. These are intimately concerned with more systematic use of livestock on the farm and the widening of the cropping system, so that the land is less frequently cropped and more frequently grazed. These practices were readily justified in the mind of the farmer when low prices ruled for wheat and profitable returns were available from livestock commodities. Now, however, unless this and other warnings are heeded, the farmer is apt to lose sight of the agricultural advantages of livestock in his enthusiasm to grow more wheat. If he is wise he will take a long time view of the utility of diversified farming and remember that the object of true farm management is to achieve maximum net returns from the farm, as a composite unit, with increasing, rather than decreasing, regularity. If a wave of serious overcropping follows the recovery of wheat prices, the splendid progress made during the depression in the extension of what has been termed "diversified farming" will be twiddled away. Such an eventuality, and those likely to be associated with it, and cited above, would inspire one to feel that high wheat prices over a prolonged period may do permanent injury to the national progress of our agriculture.

A national view point is not an easy one for the individual farmer to adopt, but it is the only sane one an agriculturist can advise. The land itself may be the temporary property of the individual, but it represents the heritage and wealth of the State, and accordingly should be maintained in a progressive state of production and not be allowed to deteriorate through misguided systems of agriculture. If, through these remarks, some farmers at least can be persuaded to re-call that during the period of low wheat prices the sidelines of wool, fat lambs, cows, pigs and poultry enabled them to carry on, and if, at the same time, they can be persuaded that the extra price of wheat will not justify the discontinuance of such sidelines, because of their agricultural and economic importance, then the objects of this paper will be served. Undoubtedly the only truly permanent system open to the Australian wheat farmer is diversification of interests, to the maximum of available resources.

The Means of Preventing Overcropping.

To detail the ways and means whereby overcropping may be avoided would commit one to a long discourse on livestock and the widening of crop rotations. Many data on such have been published from time to time, but by way of drawing renewed attention to certain available means, briefly, the following are the correctives suggested as being applicable to the general run of better class wheat growing localities.

1. The adoption of a farming system in which livestock play an important part.
2. Such a system commits one to the adoption of wider and more adequate rotations, under which every opportunity is given the land to recover from the severe strain of cropping.
3. By carrying sheep, horses, and other livestock, the most valuable plant food ingredients are retained on the farm through their droppings, and organic matter is constantly being returned to the soil from decaying plant tissue during the periods of grazing.
4. It is not necessary to burn wheat stubbles when they are rested as grazing areas.
5. Temporary pastures can be used to make the grazing periods more profitable and to encourage greater cover and thereby provide sources of organic matter. Species such as Wimmera Rye Grass, Lucerne, and Burr Medic have proved to be invaluable in this respect. Adequate supplies of phosphate encourage the growth of such legumes as the Medics, which are present over large areas of our wheat lands.
6. The use of oats exclusively for grazing, sown on stubble areas with disc drills and before the opening rains, helps tremendously to assure early feed for livestock. There are a number of oat varieties of which Fulghum is a good example, which may well be considered among the most useful of our annual pasture plants.
7. The growth of peas as a regular crop on the farm, for the use of livestock. This crop will grow sufficiently well on most of our wheat lands to warrant its use; even if poor returns are obtained, the benefits it is able to confer on the soil make the crop worthwhile.
8. The cropping programme should be so arranged (*a*) that one paddock may be given the chance of immediate recovery by resting it, from wheat, under temporary pasture, for a period of at least five years, and (*b*) that wheat is not grown on any one paddock more frequently than twice in seven years, with the exception of any paddock that has already had a long rest, when it should not be cropped more frequently than one year in every three. Under such circumstances higher wheat yields per acre can be confidently expected.

Other Considerations.

Apart from the general and more significant viewpoints presented in the foregoing there are other considerations which might well exercise the mind of the farmer as a result of better wheat prices. The first of these is of an economic character. During the depression every avenue possible was exploited to acquire export markets and to make sure that those markets were sufficiently open to encourage a fairly long-range policy. Excellent results followed these efforts and prices have ruled firm for practically all animal produce. Much ground will be lost unless the individual farmer hesitates before adjusting his present farm policy, which embraces animal sidelines, a policy that propaganda, backed by low wheat prices, originally encouraged him to undertake. He should remember, above all, that animal products are likely to rise in sympathy with foodstuff prices. An example will make the matter clearer. With the onset of higher wheat prices many farmers have given up pig raising because they feel that it will not pay to feed them grain while such good prices are available. It is obvious, however, that because of the general rise of grain values throughout the world, pig products will eventually rise accordingly. The response has already occurred and quite payable returns have reinstated the confidence of the men who held fast to the sideline that had served them so well during the depression. During the depression the pig market was greatly invigorated by the development of an export market; if farmers neglect to continue with the pig industry this self-same export market may be irrevocably lost.

Another development likely to take fire when high rates for wheat are sufficiently well guaranteed is inordinate and thoughtless haste in the purchase of tractors. Tractors are undoubtedly here to stay, and they have a definite place and use on many farms, but it should be remembered that successful tractor farming depends chiefly on large unit areas. Unless there is a large area to deal with and ample work to warrant the initial outlay, it would be wise to regard the tractor as a luxury and not a necessity. Far better, when the area is sufficiently large, to invest in more sheep and crop less. From the national viewpoint tractor farming has nothing to commend it under present Australian economic conditions.

As a final gesture, may I also plead the case of better quality wheats. During the last few years the farmers of South Australia have responded with admirable loyalty and understanding to the policy of discarding varieties, known and proved to be low in baking characteristics and which, it was conceived, would, if grown in sufficiently large quantities seriously jeopardise the good name of South Australian wheat on the world's markets. With the return of high prices for wheat may the national importance of this question be sufficient to inspire men on the land to make reasonable quality one of the first desiderata of the varieties they choose to grow.

Final Results of Cereal and Hay Harvest, 1936-37

[By A. W. Bowden, Government Statist.]

WHEAT, 1936-37.—28,714,653 bushels. Average per acre, 9.39 bushels.

WHEAT, 1935-36.—31,615,744 bushels. Average per acre, 10.58 bushels.

There are still a few minor wheat districts where the completion of the collection has been delayed and a number of odd returns from farmers in other districts outstanding, but, rather than further delay the final results, a safe estimate has been made for all these, and hence the totals now submitted may be accepted as final.

Survey of Conditions, &c.

It will be remembered that the official estimate of the wheat harvest published in December, 1936, was 28,650,000 bushels, being based on reports received during the first week in December. The final result now published—28,714,653 bushels—is only 64,653 bushels more than the estimate. Harvesting was delayed by wet weather but there were no heavy winds or hail and practically no loss of grain occurred. The yield of oats—2,363,806 bushels—was only 36,194 bushels less than the estimate of

2,400,000 bushels. There was a lesser acreage under barley than expected, and the yield of 4,260,462 bushels was 589,538 bushels below the estimate of 4,850,000 bushels. It was the lowest barley yield since 1930-31. Much less hay was cut than usual; the average cut of wheaten and oaten hay for the previous five seasons had been 559,950 tons, and it was estimated that 535,000 tons would be cut this year, but the final result shows only 475,147 tons or 84,803 tons less than the average.

Growers, and Acreage Sown.

WHEAT GROWERS.—There were 13,837 (13,748) growers of wheat for all purposes for the season 1936-37, and of this number 12,923 (12,784) reaped areas for grain. 1,811 (1,798) reaped areas of under 50 acres. Share farmers are counted once only.

ACREAGE.—The grand total acreage sown to wheat, barley, and oats for all purposes was 4,412,088 (4,317,146) acres, an increase on the previous year of 94,942 acres.

WHEAT.—3,307,689 (3,210,238) acres—Grain, 3,058,457 (2,989,490) acres; hay, 243,561 (213,703); fed off, &c., 5,671 (7,045).

BARLEY.—332,926 (414,419) acres—Grain, 304,559 (393,741); hay, 4,471 (3,389); and fed off, 23,896 (17,289).

OATS.—771,473 (692,489)—Grain 414,723 (299,771); hay, 277,413 (334,529); fed off, &c., 79,337 (58,189).

Production and Averages Per Acre.

WHEAT.—28,714,653 (31,615,744) bushels, decrease 2,901,091 bushels; averaging 9.39 (10.58) bushels per acre.

BARLEY.—4,260,462 (6,493,983) bushels, decrease 2,233,521 bushels; averaging 13.99 (16.49) bushels per acre.

OATS.—2,363,806 (2,380,908) bushels, decrease 17,102 bushels; averaging 5.70 (7.94) bushels per acre.

HAY (wheaten, oaten, and barley).—478,439 (563,471) tons, decrease 85,032 tons; averaging 0.91 (1.04) tons per acre. Distributed as follows:—Wheaten, 254,136 (246,164); oaten, 221,011 (314,371); barley, 3,292 (2,936) tons.

Benefits from Fallowing.

Of last season's wheat crop 2,193,470 (2,095,668) acres sown on fallow yielded 24,611,242 (26,846,254) bushels, averaging 11.22 (12.81) bushels per acre, and 864,987 (893,822) acres sown on unfallowed land yielded 4,103,411 (4,769,490) bushels, averaging only 4.74 (5.34) bushels per acre, thus making the State average 9.39 (10.58) bushels per acre.

Marketing the Crop.

The carry forward was 1,000,000 bushels, and with the 1936-37 crop a total of 29,700,000 bushels was available. 3,300,000 bushels are required for seed and probably 4,700,000 bushels for home consumption, including feed for stock and a three months' supply carry forward before the next crop is matured; less this 8,000,000 the balance available for export was approximately 21,700,000 bushels.

To date of this article, it is estimated that 12,000,000 has been exported, leaving a balance available for shipping of 9,700,000 bushels.

Area Intended to be Cropped, 1937-38.

Particulars have been received from farmers in all hundreds of the State as to the areas intended to be sown for the 1937-38 season. These indicate that the following areas were intended to be sown for grain, hay, and fodder:—3,370,000 (3,307,689) acres with wheat, increase 62,000 acres; 400,000 (332,926) acres with barley, increase 67,000 acres; and 770,000 (771,473) acres with oats; a total for these three cereals of 4,540,000 (4,412,088) acres, increase 128,000 acres. The intended acreages for 1937-38 as compared with two years ago show an increase of 159,000 acres for wheat, a decrease of 14,000 acres for barley, and an increase of 78,000 acres for oats; total increase 223,000 acres.

The power unit of a mallee farm.

Wheat Growing in the Mallee

[By R. L. Griffiths, D.D.A., District Agricultural Adviser.]

Continuation of a Record of the Chandos District Wheat Crop Competition for 13 Seasons, 1924 to 1936.

(*Continued from page* 853.)

Cultivation Practices.

It is usually considered that cultivation methods have a greater influence over ultimate crop returns than any other single factor. In a district such as this, it is perhaps more important than elsewhere to obtain reliable information concerning cultivation, as it cannot be said that there is yet any standard method. Many mallee farmers came from districts of higher rainfall and heavier types of soil, only to find eventually that standard methods of older districts were not successful in the new area, and so a modified technique had to be evolved.

The chief factor which has caused these modifications has been the increasing tendency of the sandy soils to drift—cultivated land sometimes moving until it becomes a series of ridges and hollows, quite unsuitable for crop growing. In the attempt to correct this trouble, which must be controlled if wheat growing is to continue at all possible, farmers have tried several modifications:—Using sheep for weed destruction instead of cultivating; lightly seeding ploughed land with oats instead of the usual bare-fallow, and working this land carefully during the period between harvest and seed time; also refraining from the burning of stubbles, breaking up the straw with sheep, and eventually cultivating it in or leaving it on the surface of the cultivated land. All of these methods are at least partly effective.

It must be remembered that in these areas—chiefly of medium to light soils—the various objectives of cultivation may be attained differently from those where land is heavy. Thus, in conservation of moisture, the land being self-mulching, there is seldom need to break a surface crust. The land also is largely self-aerating, not needing so much opening up to expose it to the air. On the other hand, firm seedbeds are more difficult to attain, and if underlayers are disturbed, it is often extremely difficult because of light-textured soils and moderate to low rainfalls, to get them firmly compacted by seeding time. The checking of weed growth, of course, is of equal importance on all classes of soil. It has been necessary to learn how best to attain these various objectives, and so the information obtained from the records of such a competition as this one, which include time and method of fallowing and also method and number of subsequent cultivations, is likely to be very valuable. Only 23 of the 838 crops have been sown on unfallowed land, there being occasional entries on new or grass land.

Time of Fallowing.

No record was kept of fallowing time during 1924 to 1926. Since that period information obtained was as follows:—

CHANDOS CROP COMPETITION.

TIME OF FALLOWING.

No record for years 1924, 1925 and 1926.

Fallowing Time.	1927.	1928. (a)	1929.	1930. (a)	1931. (a)	1932.	1933.	1934.	1935.	1936.
Before end of June, Number of Fallows	18	—	15	—	—	10	18	13	10	8
During July, Number of Fallows	42	—	51	—	—	27	15	21	33	11
August and later, Number of Fallows	18	—	23	—	—	7	5	4	16	6
Percentage of Fallows before end of July	77%	75%	74%	84%	75%	84%	87%	89%	73%	76%

(a) In 1928, 1930, and 1931, only the *percentages* of fallows before end of July were recorded.

From the foregoing it can be seen that the majority are early winter fallows, 76 per cent. of the total having been completed before the end of July. This is one of the most important points demonstrated by the Chandos competition.

At the beginning of the period a few farmers experimented with summer fallows with the initial working soon after harvest work was finished, giving a total fallow period of 14 to 15 months. Experience showed that there was little difference between these summer fallows and early winter fallows, but a great deal of difference between early winter and late winter or spring fallows. It has been proved definitely that it is necessary to fallow at such a time that most of the winter rain falls after the initial fallowing operation has been completed, thus giving a greater moisture content in the subsurface layers to assist chemical and bacterial action, and also greater assistance in the compacting of these underlayers.

There seems to be little difference between July fallows and earlier fallows, but August fallows are usually inferior, and in most cases crops on August fallows are found in the lower half of the competition list. Occasionally, though not often, seasonal conditions will upset this. Thus it will be noted that in the 1935 competition there was a sudden increase in crops on late fallows, and many of these proved to be among the leading crops. This was due to the fact that in the previous year July was a dry month, making fallowing work difficult, and subsequent heavy rain made later ploughed areas very similar to the earlier ones.

It has been proved without doubt that the correct procedure in these areas is to commence fallowing immediately seeding has been completed, and to continue, so far as possible, without interruption until the whole area intended for fallow has received its initial cultivation, not leaving a gap—as some farmers do—between seeding and fallowing, in order to rest the horses, or for any other reason. Horse teams should be kept in fit condition for this purpose.

Method of Fallowing.

Land in the mallee is not deeply fallowed, as experience has shown that when the initial operation is deep, it is difficult subsequently to get effective consolidation of the seedbed, and so with fallowing depths of only 2in. to 3½in. there is a choice of implements for the work. Records of fallowing implements used, which have been kept since 1929, are as follows:—

CHANDOS CROP COMPETITION.

METHOD OF FALLOWING.

(No record kept until 1929.)

	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	Total.
M. B. Plough	71	57	48	39	39	27	53	21	355
Disc	11	6	8	5	–	6	4	3	43
Cultivator	7	9	7	2	—	5	2	1	33
Total	89	72	63	46	39	38	59	25	431

Mouldboard plough used for 82% of fallows.

The above records show that the mouldboard plough is by far the most usual implement being used for 82 per cent. of the fallows. Mouldboard ploughs include the heavier as well as the lighter and skim plough types, and are decidedly the best when there is grass or weed growth on the surface to be destroyed or buried, the type of plough varying with the country to be fallowed, heavy ploughs for clay land, because of more even work with improved aeration of soil; and skim ploughs for sandy land. Although usually the most effective, it should be remembered that heavy fallowing ploughs, because of slow operation, make the fallowing more expensive, and so at times other implements may be used to advantage.

A strongly built cultivator, in good order, will do good work on all except heavy soils when the land has been kept almost bare of grass and weeds by sheep, or when there is little growth because autumn and winter rains have been light. Also on land subject to drift, where broken stubble residues are used to restrain surface movement, the use of a tine cultivator, which will leave these residues on the top, is better in every way than that of a plough which will bury them.

Disc implements are sometimes necessary in the development of new land, but rarely do good fallowing work, owing to the difficulty of controlling depth, particularly in sandy soils.

It is likely that always the fallowing implement will vary somewhat with the season, the objective, apart from weed destruction, being to stir thoroughly all of the soil to an even depth.

Fallow Working.

There has been a great change in the working of fallow during the period of this competition. This is shown by the average number of workings given. No record was kept in 1924 and 1925, but since then the average number of workings, not including the initial fallowing or the seeding operations has been—

FALLOW WORKING.

(No record kept 1924 and 1925.)

Average number of fallow workings, not including initial fallowing or seeding operations.

1926—6·3
1927—5·5
1928—5·5
1929—3
1930—Between 2 and 3
1931—3
1932—Little over 3
1933—Between 3 and 4
1934—3
1935—3
1936—2·6

It will be seen from the above table that fallows received much more working during the years 1926 to 1928 than subsequently. During these years mallee farmers were copying the successful practice of other wheat growing areas where the cultivation of fallowed land after each rain of any consequence led to increased crop yields. Various factors caused the decrease in number of fallow workings, the chief of which was the tendency of all the lighter soils to drift, and this was increased by further cultivation. Also it was gradually realised that self-mulching soils required less working than those on which surface crusts formed, until it is now becoming a standard practice, after fallowing, to keep the land as clean as possible with sheep, only cultivating when weed or grass growth cannot be dealt with in this way, until the harvest period is over, and then preparing the land for seeding as carefully as possible during late summer and autumn.

Experience has shown in this district that while spring and summer work may be reduced, provided sheep will control weed growth, this careful autumn cultivation is very important, especially if rain falls during this period.

It is necessary, also, to control depth of cultivation as exactly as possible, in order that the action of rain in compacting the underlayers is not destroyed. In the earlier years of this competition many crops were seen where the land, even at judging time, was still loose and open; this has been much less in evidence during recent years, showing that farmers have learned to keep cultivating implements in better order to get regularity of depth, and also to control them better to avoid excessive depth.

The use of the harrow on fallows in this competition is interesting. Since 1926 the percentage of harrow work to total cultivation has been as follows:—

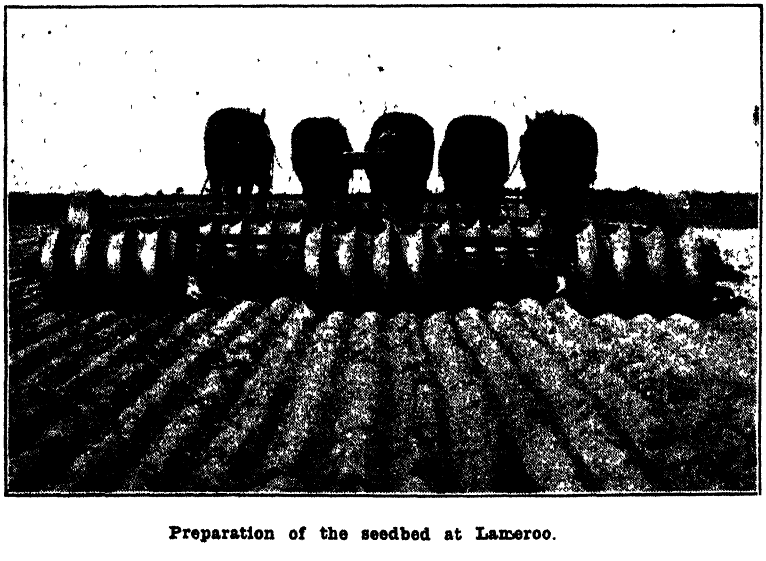
Percentage of work with harrows to total cultivation.

1926—37%
1927—43%
1928—40%
1929—31%
1930—23%
1931—19%
1932—16%
1933—25%
1934—18%
1935—35%
1936—18%

It will be seen that in the earlier years the harrow was used almost as much as the cultivator. The level surface left after harrow work was an encouragement to drift, and the popularity of this implement gradually declined until 1932, when harrowing was less than one-sixth of total cultivations. Since then there has been some increase in popularity, due chiefly to the use of the cultivator point attachments to the usual harrow. These points make of the harrow an effective killer of seedling weeds, while because of lightness and backward set of the points there is no danger of excessive penetration, and the land is left with a shallow mulch over the seedbed. It is likely that harrows fitted with cultivator points will become more popular in future years, for autumn working just prior to seeding.

For some years the number of workings between fallowing and seeding has been approximately three, with recently most of the work being done between harvest and seeding.

Chandos farmers now usually realise that in the handling of fallow in their district the objectives are—(1) The prevention of surface soil drift. (2) Effective control of weed growth, either by sheep or cultivation. (3) The retention of good seed-bed conditions, when the underlayers have been consolidated by rainfall.



Preparation of the seedbed at Lameroo.

Seeding Operations.

After all preparations have been made, the yield of the crop can be affected very greatly by the methods adopted when seeding. Records of the Chandos Crop Competition give an excellent guide to all seeding operations, including time of seeding; treatment of seed and method of sowing; amounts of seed and of fertiliser.

TIME OF SEEDING.

A very complete record has been kept since the beginning of the competition of seeding times, there being only 7 crops of the 838 for which the seeding time could not be obtained. As time of seeding can be a very important factor, though dependent somewhat on seasonal variation, it is very useful to be able to define the optimum seeding period.

The actual time of seeding has been as follows, the numbers denoting the number of crops sown during each period each year:—

CHANDOS CROP COMPETITION.

TIME OF SEEDING.

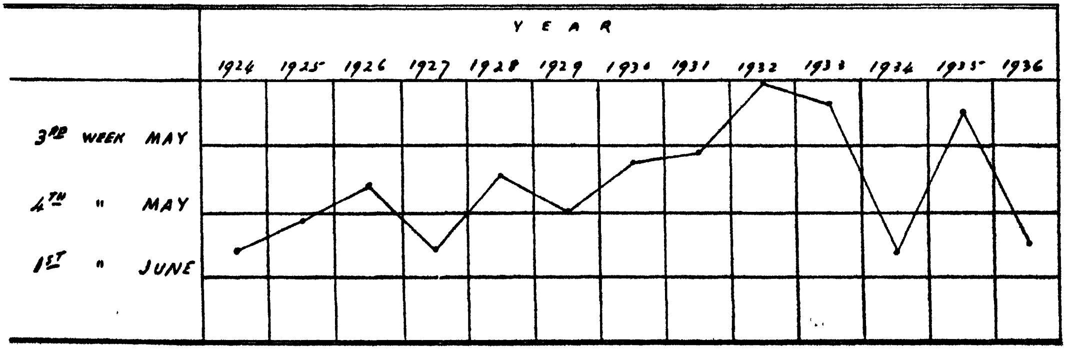
	1924.	1925	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	Total.
April	1	1	—	1	3	—	1	—	3	1	—	1	—	12
1st week May	1	2	4	1	9	5	2	5	13	8	4	10	2	66
2nd week May	8	3	10	5	19	7	12	5	9	7	5	14	5	109
3rd week May	6	7	13	10	26	8	16	21	7	11	4	11	1	141
4th week May	9	11	10	14	28	26	12	18	10	6	2	7	2	155
1st week June	10	9	10	15	27	17	5	2	4	2	5	9	5	120
2nd week June	15	5	14	18	14	13	7	6	2	4	8	3	5	114
3rd week June	5	7	5	7	3	8	2	1	1	—	3	2	1	45
4th week June	7	5	—	6	6	6	—	5	1	—	3	1	4	44
July	1	—	—	2	2	2	12	1	—	—	3	2	—	25
	63	50	66	79	137	92	69	64	50	39	37	60	25	831

Although the table shows times of seeding from April to July, 85 per cent. of all crops were sown between the beginning of May and the middle of June, with the most popular time from the beginning of the 2nd week of May to the end of the 2nd week of June, and this gives a good guide to the best seeding period.

It will be noticed that there are seasonal variations, for instance, in 1930 there were 12 crops sown in July, which was caused by a very dry period during June. In an endeavour to show even more exactly the best seeding time, the middle of the seeding period each year has been determined—that is, the time when just half of the competition crops have been sown, and this is shown in graph form.

The graph below shows that the mid-seeding period has varied from the middle of the first week in June to the beginning of the 3rd week in May, the

GRAPH SHOWING AVERAGE SEEDING TIME.



Graph line shows mid-seeding period of competition crops for each year.

average being about the 27th of May. Violent fluctuations in 1934 and 1936 are due to the early seeding period in these two years being very dry—in 1936 there was little rain until 28th May—but the general impression given by the graph is that average seeding time has tended to become earlier.

Early in the competition years Chandos farmers were inclined to follow the lead of other districts where late seeding had been adopted with success. These, however, were districts of heavy fertile soil, and it was quickly seen that the lighter mallee soils, which quickly become cold in winter, did not grow good late sown crops. Often the late seeding was due to an attempt at better weed destruction, which, while admirable, sometimes defeats its own object, as early sown vigorous wheat plants smother out many weeds, while late sown plants, weak until the spring months, may be beaten even by the fewer weeds which remain; also early sown wheat, growing vigorously during autumn, quickly eliminates danger from sand drift.

There is very little danger of grain malting in these soils, and experience is continuously showing that, while some precautions are necessary to reduce weed growth, the farmers who are growing the best wheat crops are those who consistently sow early.

It was mentioned several times in the annual reports that the order of seeding of varieties was sometimes wrong; that mid-season varieties were sown too late, while early, tall, weak-strawed kinds, liable to lodge, were sown too early. It is necessary not only to sow at the right time, but to sow varieties in their correct order of maturity with late, slow growing sorts first.

TREATMENT OF SEED AND METHOD OF SEEDING.

The following tables show details, which were not taken until 1929, of seeding methods, also particulars of grading and pickling of the seed.

CHANDOS CROP COMPETITION.

SEEDING DETAILS.

Number of Crops.

Year.	Method of Seeding.		Grading of Seed.			Pickling of Seed.			
	Combine.	Drill.	Graded.	Winnowed.	Ungraded.	Dry Pickled.	Formalin.	Bluestone.	Unpickled.
1925	—	—	—	—	—	5	21	20	5
1929	85	7	69	4	19	72	8	9	3
1930	64	5	52	4	13	50	10	2	7
1931	59	5	46	4	14	40	10	2	12
1932	44	6	37	7	6	40	5	2	3
1933	36	3	33	4	2	35	2	1	1
1934	36	3	34	3	2	33	2	1	3
1935	55	5	45	13	2	44	4	—	12
1936	24	1	22	—	3	23	—	—	2
	403	35	338	39	61	337	41	17	43
	438		438			438			

SEEDING METHOD.

It can be seen that nearly all crops were sown with various makes of combine, drills only being used for 35 out of 438. The convenience of the combine and its better weed-destroying capacity, has led to this popularity. It is very doubtful whether the seed has actually been sown any better, or even perhaps as well, as if drills had been used. Combines in good order will open up the furrows for the seed to a correct regular depth, though on light soils the heavier implements have a tendency to go too deep unless watched carefully, and strained tines will also cause irregularity.

With some combines, although the furrow is made correctly, the seed falls from so high on the tine, and so far back from the point making the furrow, that any loose earth has an opportunity to reach the bottom of the furrow before the seed does, and so the seeding depth may be irregular, germination patchy, and some of the plants weak. It is worth taking any amount of trouble to make sure that the seed is sown regularly on the compacted seedbed surface, which, if previous work has been well done, will not be more than 1½in. deep. When a combine sows correctly it is undoubtedly a more efficient implement than a drill.

Seeding operations in the Chandos district.

Grading of Seed.

It will be noticed from the details given that seed grading is becoming a standard practice, and only very few competition crops during recent years have been sown with untreated seed. Because of the elimination of impurities, also of all inferior grain, grading is entirely jusitfied, the resulting crop being cleaner, and with a more even, strong type of plant. Winnowing of seed only half does the work, though better than no treatment at all. Unfortunately, many of the smaller farm grading machines do not remove large weed seeds such as barley. Contract grading by portable machines is becoming more popular and this is the most thorough method, as these machines are fully equipped to remove all impurities, provided only that the grain is not run through them too fast.

Pickling of Seed.

These details show the popularity of dry pickling, which now has entirely replaced the earlier methods of wet pickling with bluestone or formalin, both of which, though excellent fungicides, were likely to have a harmful effect on germination. The rapid change is seen as a contrast with the details which were taken in 1925, when the seed for 41 crops was wet-pickled, and only 5 dry-pickled. The dry-pickling with copper carbonate or mercury preparations is quite effective as a control against ball smut, provided it is done correctly. This will be further discussed when dealing later with the control of diseases.

Amount of Seed.

The quantity of seed sown is not a very important factor in wheat growing, as the moisture available at the end of the growing season is usually the controlling factor, thus when spring rains fall, all the stools on each plant mature, heads are larger and better filled, while in dry seasons many of the weaker stools do not form heads, and in the denser crops ears are small and poorly filled, while those in the thinner crops make up by number of grains per ear for the smaller number of ears.

Experimental results everywhere have shown, over a period of years, that varied rates of seeding give very much the same yield.

The average seeding each year with the highest and lowest amounts used has been as is shown on the following page.

CHANDOS CROP COMPETITION.

AMOUNT OF SEED.

Year.	Lbs. per Acre. Lowest Amount Sown.	Lbs. per Acre. Highest Amount Sown.	Lbs. per Acre. Average Seeding of All Crops.
	Lbs.	Lbs.	Lbs.
1924	50	90	66
1925	60	86	69
1926	60	80	69
1927	40	80	63
1928	43	90	60
1929	40	85	59
1930	45	80	59
1931	45	75	58
1932	45	75	60
1933	45	70	60
1934	45	70	59
1935	45	74	60
1936	52	75	61

It is evident that early in the history of the competition there was a tendency with some farmers to use high seeding rates, again following the example of other districts. That these higher amounts were unjustified was soon shown, and since 1928 the average has not varied more than two pounds from a seeding of one bushel per acre. Also each year there has been an increasing percentage of crops sown with exactly this quantity. It is certain, then, that the best average seeding per acre has been proved to be one bushel.

This will vary a little, of course, according to circumstances, somewhat larger seedings being made for late sowing; for early, poor stooling varieties; for large-grained sorts than for early sowing, with consequent better stooling; for good stooling varieties; and for small-grained wheats. Also, sometimes it is good policy to sow more heavily when competition from weed growth is feared, while less can be used of graded than of ungraded seed.

AMOUNT OF SUPERPHOSPHATE.

While amount of seed is not important, the amount of superphosphate used is likely to be one of the most important factors in ultimate yield of the crop. These mallee soils are very deficient in phosphate, and it is necessary, if productivity is to be increased, not only to supply sufficient for crop requirements, but also to build up a reserve in the soil, so that leguminous plants may grow during pasture years, and supplement economically another element—nitrogen—which also is likely to be deficient.

Annual competition reports show the value of super. very clearly, as the greater number of entries where high amounts have been used have always been at the top of the competition, thus in 1926, the average amount applied to crops in the top half of the competition was 134lbs., and in the lower half 102lbs.

High grade 45 per cent. super has chiefly been used, and, in order to get a correct basis for comparison, where other grades were used the amount has been adjusted to the equivalent quantity of 45 per cent. super.

Average super. dressings each year, with the highest and lowest dressings, have been as follows:—

CHANDOS CROP COMPETITION.

AMOUNT OF FERTILISER (45% SUPER).

Year.	Lbs. pre Acre. Lowest Amount Used.	Lbs. pre Acre. Highest Amount Used.	Lbs. pre Acre. Average Amount Used for all Crops.
	Lbs.	Lbs.	Lbs.
1924	60	180	99
1925	70	180	108
1926	60	190	118
1927	70	170	106
1928	66	160	106
1929	60	140	101
1930	70	140	99
1931	60	140	80
1932	60	112	90
1933	60	112	90
1934	60	120	90
1935	70	186	93
1936	90	140	105

It can be seen that during the early years of the competition phosphate amounts were very satisfactory, individual quantities up to 190lbs. per acre being used, and averages being from 99lbs. to 118lbs. During this period not only did crops improve, but pastures also, and it was not unusual to see a good growth of naturalised clovers even on top of the sandhills. These clovers were providing an excellent tonic, and improving soil productivity.

Unfortunately economic conditions then upset the regular programme of many farmers; lower rainfall years, and later disastrous low prices for wheat made the financing of superphosphate more difficult, and the result is seen in the amounts used from 1929 to 1935, where averages ranged from 101lbs. to 80lbs. per acre.

Some economy in phosphate purchases may have been justified, the effect being the exploitation of soil phosphate reserve in the attempt to carry over the lean period, but it was usually continued for too long, and both crops and pastures suffered, clovers disappearing altogether on many farms. Each year, also, until 1936, the lowest amounts were 60lbs. to 70lbs., and this is definitely too low. It is a general rule that economy in phosphate dressings is a false economy, and at least 1cwt. per acre should be the standard dressing.

It is encouraging that farmers now realise this, last year showing a decided improvement, with an average amount of 105lbs., and the range between maximum and minimum less than usual—from 140lbs. to 90lbs., which is quite a satisfactory state of affairs.

(*To be continued.*)

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

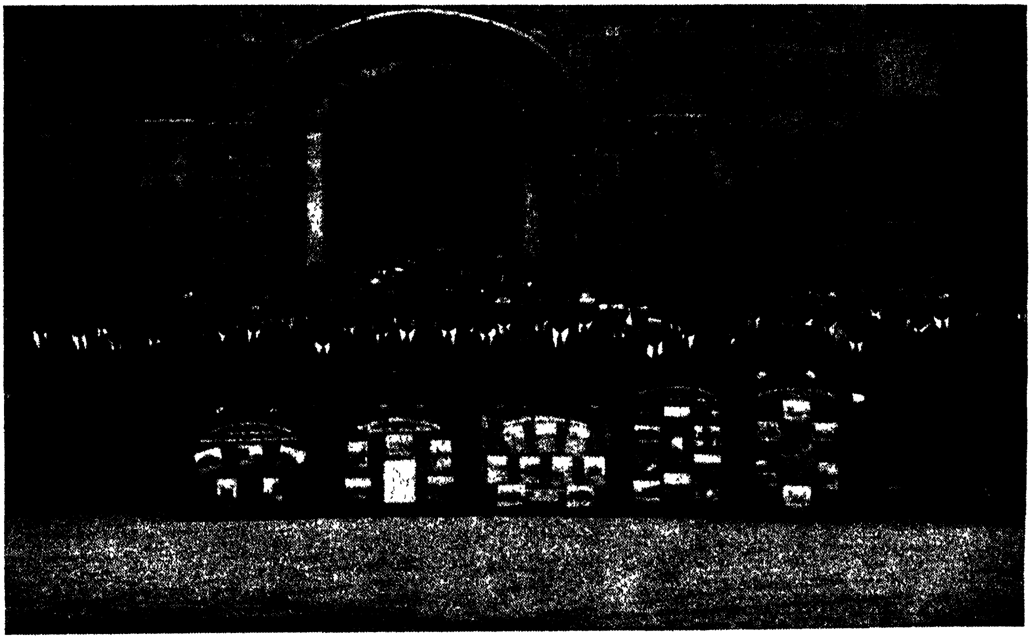
Crystal Brook, Wednesday, 1st September.
Gawler, Thursday, 23rd September.
Denial Bay, Friday, 24th September.
Tailem Bend, Saturday, 25th September.
Balaklava and Dalkey, Saturday, 25th September.
Tailem Bend, Saturday, 25th September.
Waikerie, Saturday, 25th September.
Eudunda, Wednesday, 29th September.
Wudinna, Wednesday, 29th September.
Two Wells, Saturday, 2nd October.
Kapunda, Saturday, 2nd October.
Orroroo, Wednesday, 6th October.
Streaky Bay, Wednesday, 6th October.
Renmark, Wednesday, 6th October.
Karoonda, Wednesday, 6th October.
Murray Bridge, Thursday, 7th October.
Moonta, Saturday, 9th October.
Blyth, Saturday, 9th October.
Jamestown, Wednesday, 13th October.
Strathalbyn, Wednesday, 13th October.
Tarlee, Wednesday, 13th October.
Penola, Wednesday, 13th October.
Colton, Wednesday, 13th October.
Loxton, Wednesday, 13th October.
Kimba, Wednesday, 13th October.
Browns Well (Paruna), Saturday, 16th October.
Kingston, Saturday, 16th October.
Mannum, Saturday, 16th October.
Pinnaroo, Wednesday, 20th October.
Maitland, Wednesday, 20th October.
Mount Gambier, Wednesday and Thursday, 20th and 21st October.
Willunga, Thursday, 21st October.
Clare, Saturday, 23rd October.
Port Elliot, Saturday, 23rd October.
Minlaton, Wednesday, 27th October.
Tatiara (Bordertown), Wednesday and Thursday, 27th and 28th October.
Millicent, Saturday, 30th October.
Burra, Saturday, 30th October.
Yankalilla, Saturday, 30th October.
Mount Barker, Saturday, 6th November.
Woodside, Saturday, 13th November.
Kalangadoo, Saturday, 13th November.
Mundalla, Wednesday, 9th March, 1938.
Mount Pleasant, Thursday, 17th March, 1938.

Cropping Results of the 1936-37 Season at Roseworthy Agricultural College

[By ALLAN R. CALLAGHAN, D.Phil., B.Sc. (Oxon.); B.Sc.Agr. (Syd.), Principal Roseworthy Agricultural College.]

A Year of Low Rainfall.

The year 1936 was one of the driest ever experienced at the College, and justifiably may be classed a drought year. In common with districts in a narrow 30 mile fringe of country along St. Vincent Gulf, extending from Gepps Cross and opening into County Daly with Kadina at its upper limit, the College suffered more from rain shortage than any of the other recognised safe wheat growing areas of the State. The total rainfall recorded at College for the year was only 13.15 inches, and of this only 9.22 inches fell during the growing period of the crops, i.e. the period April to October inclusive. Actually the 13.15 inches recorded for the whole year were not equal to the average rainfall for the April-October period, and it was 4.25 inches below the average annual rainfall of 17.40 inches.



During the season 1,016 farmers and others interested in rural pursuits were conducted round the College farm in groups of from 30 to 200. In October alone 10 field days were arranged at which a total of 630 attended.

For January and February of 1936, 1.90 inches and 0.44 inches were recorded respectively. No rain whatever fell in March, and although 92 points were recorded in April, they were of little real value at such a time when good opening rains are expected, as they represented the sum total of scattered showers which had little effect, except on fallows where an initial but scanty germination of weeds occurred. Only on the sandy rises of stubble and pasture fields was any germination noted. During the early part of May there was no rain of any consequence and the position began to take on a serious aspect. It was not until the last two days of May that the season opened with over an inch of good soaking rain, and the month closed with a recording of 1.50 inches. In spite of the excellence of this rain it was too late for feed purposes as cold conditions retarded growth, and at no time during the winter did feed make any substantial headway. The rain, however, solved cropping difficulties, and although pre-seeding destruction of weeds had not been possible, seeding, already late, proceeded without further delay.

The June rainfall of 1.60 inches was also well below average for this month (2.42 inches) and July rains were scattered and rather too superficial. Both months, however, kept the wheat crops in excellent growing condition, but stubble sown crops of oats and barley showed the undoubted need of good so-called "sub-soil" rains. The 162 points recorded for July would have been satisfactory had it not been for a long dry spell during August. A saving rain on the last three days of this month temporarily relieved the situation. These latter rains brought the total for August to 113 points, the lowest August rainfall recorded at the College for 8 years, and which represented only half the average for the month.

Following the poor rains during seeding and establishment periods, conditions at this stage were by no means propitious, feed had hardly made sufficient growth to keep ahead of grazing requirements, and hay and silage prospects had dwindled with the extreme backwardness and shortness of all crops. The wheat crops, all sown on fallow, although backward were still in bright healthy condition, and with reasonable to good spring weather, satisfactory yields were still possible.

The dry conditions that had caused apprehension during August continued with disappointing severity throughout the whole of September and had disastrous effects on stubble crops and feed, and undermined the crops on fallow. Only 30 scattered points, practically useless, were credited to September and by this time the rainfall for the 9 months of the year was only 9.41 inches, of which 2.34 inches had been received in January and February. Only one chance remained, if total failure were to be averted; fortunately this one chance was realised at the very last moment, for 215 points were received in October, much too late to help the hay position, but just in time to guarantee the full and proper maturation of the grain in crops that had survived. These rains enabled all the wheat crops to yield optimum returns from the rather meagre but healthy vegetative foundations.

The saving rains of October represented the highest recording for any previous month of the year, and brought the total April-October rainfall to 922 points. The distribution of the rainfall for the growing period of the crops is summarised below, and for comparison the average rainfall for each month is included in brackets.

The accompanying graph illustrates the wide difference that existed between the rainfall received last year and the average monthly precipitation.

April	92 points	(146)
May	150 points	(194)
June	160 points	(242)
July	162 points	(188)
August	113 points	(205)
September. . .	30 points	(190)
October	215 points	(169)

Only in two years previously had the seasonal rainfall been lower, namely in 1919 when 8.17 inches for the April-October period were recorded and in 1914 when only 4.85 inches were received.

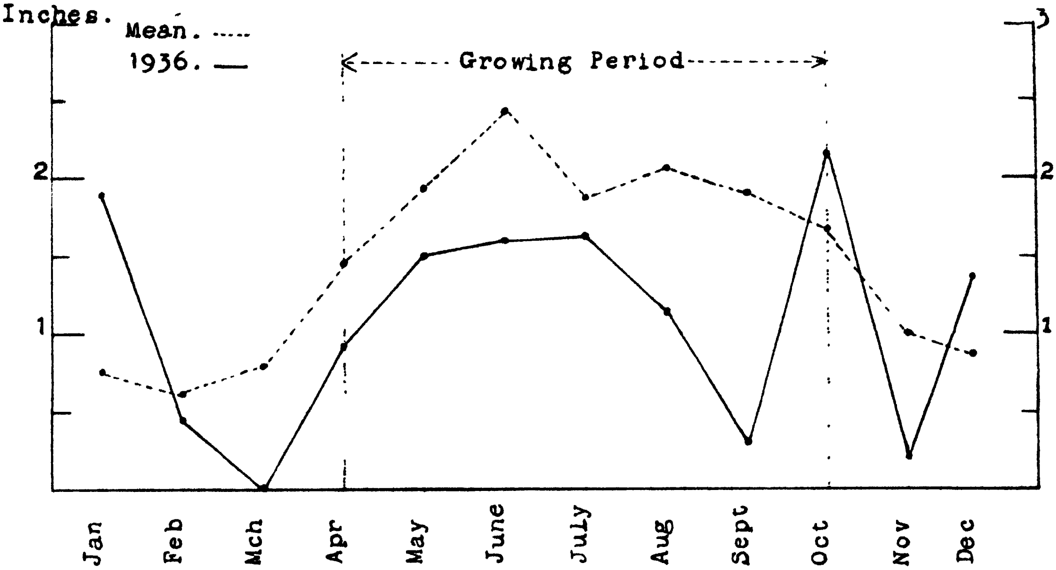
The Continuity of Carrying Capacity.

In the foregoing description an attempt has been made to portray the changing fortunes of a year that opened late with considerable uncertainty, and continued to struggle forward in the same atmosphere of uncertainty until the very end, when relief came only just in time to help the crops in their last phase of development. The greatest difficulty of all during 1936 was to meet the shortage of paddock feed, and any observer must surely admit that in such a season it was permissible to reduce the carrying capacity to conform with the shortage of natural food supplies. That the livestock carrying capacity of the College farm was not reduced, but kept at the same level as in the previous three years, is the most outstanding achievement of the 1936 season. Paradoxically enough the achievement referred to and credited to 1936 was made possible only by the exceptional year of plenty which preceded it in 1935.

Since 1933 an attempt has been made to demonstrate to the farming community of South Australia what can be done by way of assuring a continuity of carrying

ROSEWORTHY AGRICULTURAL COLLEGE.

Monthly Distribution of Rainfall for 1936 in Comparison with the Mean.



Graph showing the wide disparity between the monthly rainfall received in 1936, especially during the growing period covered by April to October inclusive, and the average monthly distribution. For eight consecutive months, from February to September, the rainfall was appreciably below average.

capacity. In 1933 and 1934 a level of carrying capacity was reached at what was considered a maximum, and the object has been to maintain this level as constant as possible. In other words the object has been to keep the number of livestock carried constant, over a period of years, with no significant fluctuation taking place in spite of good, poor, or indifferent seasons. The last four seasons have submitted the idea to a severe test, for very wide variations have been recorded. While in 1933 the number of stock carried was insufficient to cope with the fodder grown and large quantities of reserves were gathered, 1934 was a year of feed shortage due to an excessively dry period in May, June and July, and only normal yearly fodder supplies were gathered. This was followed in 1935 by a particularly good feed and fodder year, and every effort was made to put all feed reserves in a sound position. No less than 720 tons of hay and 749 tons of greenstuff as silage were conserved in that year. Little was it realised that these heavy reserves would be called upon so early as the following year, yet such was the case, and in order to maintain the livestock numbers on the place at an even keel, heavy inroads on fodder reserves were necessary throughout the year. No attempt, however, was made to "unload" and the figures of livestock carried in 1936 are practically identical with those of 1935.

ROSEWORTHY AGRICULTURAL COLLEGE.

Treatment of Farm Areas in Relation to the Livestock Carrying Capacity.

	1933. Acres.	1934. Acres.	1935. Acres.	1936. Acres.
Area fallowed	545	604	525	614
Area cropped	799	797	1,001	814
Area pasture, or ley land	635	578	453	551
Total area	1,979	1,979	1,979	1,979
Mean number of sheep	939	1,096	1,047	1,070
Mean number of cattle (including young stock)	99	90	91	86
Mean number of horses (including young stock)	78	92	91	91
Equivalent in sheep (after allowing for 50 working horses for farm operations)	1,703	1,882	1,830	1,828
Sheep per acre	0·86	0·96	0·93	0·92

These figures, especially those of 1936, bear striking testimony to the soundness of the policy of taking full advantage of the good years, not by temporarily increasing the stock carried, but by putting aside all surplus fodder in the form of reserves in order that the same numbers of stock may be carried over seasons of feed shortage. On any well managed property it is fundamentally wrong to have livestock numbers violently fluctuating in conformity with seasonal conditions. When there is a superabundance of feed every effort should be systematically directed towards gathering the surplus fodder; then in times of shortage the need does not arise to sell stock on a falling market only to buy again, when better conditions prevail, on a rising market. Fodder conservation under South Australian conditions is the only safeguard to the regularity of supply of animal produce; it regulates carrying capacity, which, besides saving the individual farmer serious losses, has wider significance in that it helps prevent oversupply of markets on the one hand and under-supply on the other.

The most severe test to the regulation of livestock numbers on a uniform basis from season to season is at present being given, for obviously with adequate reserves on hand to cover any exigency in 1936, the scheme was not due to fail, but it remains to be seen whether 1937 will be sufficiently close to average to allow of a full quota of seasonal reserves to be harvested. If this should be the case, then the carrying capacity will be assured until the close of 1938. During either 1937 or 1938, or both, every opportunity will be taken to conserve as much above seasonal requirements as possible, in this way a drought reserve will again be built up, and the future can then be faced with confidence. Just at the moment following the severe drain on conserved fodder made in 1936 and early this year, emergency reserves are seriously depleted. Provided this and next year are average years, and one or other of them a little above average, reserves will again be built up in order that the number of animals now carried for the last four years may be maintained in the future. Actually, therefore, it is a little too soon to proclaim the results as proven, they have however, already achieved something, and give every promise of proving that such a concept has definite practicability.

The Wheat Crops of 1936.

All wheat was grown on well prepared fallow, initial plowing for which was completed by the end of July, 1935. Splendid late winter and spring rains, besides having a very desirable consolidating effect, necessitated early harrowing down and cultivation. A second cultivation was carried out in October and early November with spring-tyne implements, while good rains early in January, 1936, necessitated a further light cultivation. The fallows at this time were in bright, clean condition and well consolidated for so early in the year. This was fortunate for the rainfall in February and March was negligible. In fact, no further good consolidating or weed-germinating rains were received until the end of May. That the fallows were worked into first class order as early as January, meant that the unusually dry autumn with such late opening rains did not affect the establishment and early growth of crops to nearly the same extent as would have been the case had the seed bed been loose and the fallow in unfinished order. There could be no better example of the advantages of proper attention to fallow during the summer months than that exemplified in the 1936 season; for had one, or both of the summer cultivations been omitted, or unduly delayed, it is very doubtful whether such even and vigorous early growth in the crops would have been possible.

Sufficient rain was received in April to bring about sporadic germination of weeds, but at no time before the end of May was sufficient rain received to assure a general germination of seeds on the fallows; even so, cultivations were necessary, but not near as valuable as the normal autumn or pre-seeding cultivations should be. Seeding on the fallows was risky, as sufficient moisture may have been present to start germination of the grain making survival wholly dependent on rains following within 10 days. Actually, with 30 acres of Ford wheat, the gamble was taken, and it was sown during the last few days of April. Here a fair percentage of malting resulted as no supporting rains followed, and the whole area was successfully reseeded when the rains did come in May.

Seeding began in earnest on 1st June and it was possible to continue right through the month, except for a few breaks of a day at a time. No rain of any consequence fell to complicate the process, with the result that although operations began at least a month later than usual and some varieties were sown out of season accordingly, quite an appreciable area was sown within reasonable margin of the accepted time for the varieties used. So that, with the exception of 30 acres of Ford wheat sown in No. 15 at the end of April, the most of which was re-seeded a month later, all the wheat was sown during June. The order of seeding was Ford, Nawab, Dundee, Ranee 4H, Sword, Baringa, Early Gluyas and King's White. In the cases of Ford, Nawab, Dundee, and Ranee 4H, seeding was at the rate of 75lbs. per acre; the rate was increased to 80lbs. per acre for the more rapid maturing varieties Sword, Baringa and Early Gluyas, and to 84lbs. to the acre for the even shorter seasoned King's White. In all cases superphosphate was applied with the seed at the rate of 1¼ cwts. per acre.

The late arrival of the rains had meant that seeding had to proceed immediately and no interval for weeds to germinate was allowable. For this reason the harrows were depended upon to kill weeds after the combines had sown the crop. In some cases repeated harrowings were resorted to and a little damage to the brairding crop was noticed. The lateness of the rains and the cold temperatures were responsible for very slow germination of both weeds and crop; this was actually the only difficulty met with in seeding, and taken generally, the fallows were seeded in splendid condition. The retarded rate of germination and early growth in June meant that crops were backward, but milder and better growing conditions in July encouraged more vigorous growth and some leeway was made up. By the beginning of August all wheat crops showed evenness, splendid colour, and although later than usual they were as promising as any College crops had been in recent years. The very dry September was devastating, following, as it did, a low rainfall in August. Fortunately, the plants were really well established by July and the root systems must have been well developed to stand the strain of only 30 points of rain in September, a dearth of moisture which was associated with temperatures above normal. By the end of September crops that had earlier promised excellent yields had faded into mediocrity and all hopes of high returns vanished.

As a saving grace the weather in repentance, supplied an extremely unusual and favourable finishing period. Prior to these October rains, however, the crops had literally struggled into head and had reached, or just passed, the flowering stage. It was thought at first that the rains were rather too late to be of substantial benefit to crops already in the hay stage, but this was not so, for it was by reason of the 215 points in October that the heads filled so well, and that all the grain samples were full and plump. A feature of extreme importance was that the rain was followed by cool, showery weather that gave the plants every chance of making greater use of the belated moisture supply, whereas, if normal hot conditions had followed the usefulness of the October rains would have been very much reduced. Hay yields were not helped in any way by these rains and very poor hay returns were obtained. Unfortunately, this meant that a greater area of wheat had to be harvested for hay than is usual to meet the shortage in growth, and although an area of 395 acres of fallow had been sown to wheat 185 acres were harvested for hay, from which 281 tons were gathered.

One further feature of the growing period is worthy of notice, and this concerns the feedng-off of Ford wheat in No. 15. As already stated, this paddock was seeded at the end of April and re-seeded at the end of May. With the rains, much more of the early sown seed germinated than was expected, this, and all that had germinated following the first seeding, made excellent headway. Having had a dry beginning, it was reasonable to suppose that good rains might follow. This crop was in splendid forward condition and if good rains had eventuated it was thought the crop would be too rank. Feed shortage elsewhere on the farm was a further temptation and the paddock was grazed off by a big flock during the second week in July. As the season turned out this was a serious mistake, for unfortunately, the crop never received any substantial rain on which to make its recovery. As a consequence it was in a very poor vegetative condition in October when good rains were far too late to bring it into line with other areas that had been unmolested. From this area of Ford an average yield of only 18bush. 6lbs. per acre was obtained, which was the lowest recorded on the property for the season. The feeding-off of this wheat crop was activated by special circumstances and in the last four seasons it is the only wheat crop that has been fed-off. The results incline one irrevocably against the practice, and in the early districts of the State the feeding-off of wheat crops is fraught with danger, and has very little, if anything, to commend it. Provided varieties are sown at the right time there should be no need for feeding-off, and if fed-off the harm done the crop, even under favourable conditions, cannot be recovered in other directions.

The only other variety to yield below 20 bushels per acre for the season was Sword, which, from an area of 37 acres, harvested for grain in Dalys A., yielded an average of 18bush. 33lbs. Both Ford and Sword are varieties that appear to depend on good vegetative growth for high returns. Under conditions which assure good growth of straw they yield well, but last season continuous growth was not possible, as a result these varieties were much lower in the list of yields than the wheats with a higher transmigration ratio, that is wheats like Ranee 4H which normally yield a high proportion of grain to straw. The season undoubtedly favoured wheats of high transmigration ratio, for the best yields were obtained from Dundee and Ranee 4H. Both these varieties yielded above expectations, and for the season the results obtained were very striking. Dundee grown in No. 3A, (predominantly limestone soil) over an area of 22 acres harvested for grain, returned the average yield of 26 bush. 44lbs. per acre, and topped the results for the year. Ranee 4H with an average yield of 24bush. 19lbs. per acre was next on the list. This variety was grown in Nottles A. and an area of 51 acres was harvested for grain. Ranee 4H has for the last four years been prominent in the farm returns and it seems to suit College conditions well. From experience of the last four years it appears to do well on a variety of soils.

The other yields obtained were all very creditable under the circumstances; a small area of 6 acres of Early Gluyas returned an average of 24bush. 19lbs. per acre, Baringa, from 9 acres, yielded 23 bush. 13lbs. per acre and 38 acres of King's White gave an average return of 21 bush. 5lbs. per acre. Nawab was only planted on experimental areas. It is used for this purpose because of its very good dual purpose qualities for large quantities of hay, have, of necessity, to be cut from these experiments, and the remainder is left for grain. On good fallow strips Nawab yielded well, but in the experiment concerned some non-fallow strips were poor and its average yield suffered in consequence, but, even so, it was just on 20 bushels per acre. Results from the experimental areas will be published in a separate report.

The average yield of all farm crops, but excluding experimental areas, was 22 bush. 8lbs., which is 4bush. 22lbs. above the average of 17bush. 46lbs. for 32 previous seasons. *Certainly this result exceeded all the expectations of early October, and in view of seasonal circumstances the average yield of 22bush. 8lbs. from all farm areas harvested for grain was extremely gratifying. As this was obtained from 9.22 inches of rain during the growing period of April-October inclusive, it represents a yield per inch of seasonal rainfall of 2bush. 24lbs. This, in the light of all previous College returns, constitutes a record.* The previous highest figure was established only two seasons previously in 1934, when a yield of 2bush. 22lbs. per inch of seasonal rainfall was obtained.

The 1936 season was undoubtedly an extremely severe test of the efficiency of College farming, for only on two previous occasions in our records since 1922 has there been less rain recorded during the growing period of the crop, namely, in 1919 (with 8.71 inches) and 1914 (with 4.85 inches). compared with 1936 (9.22 inches).

The following are some results obtained in years of similar low seasonal rainfall.

Results in Years of Similar Low Rainfall to 1936.

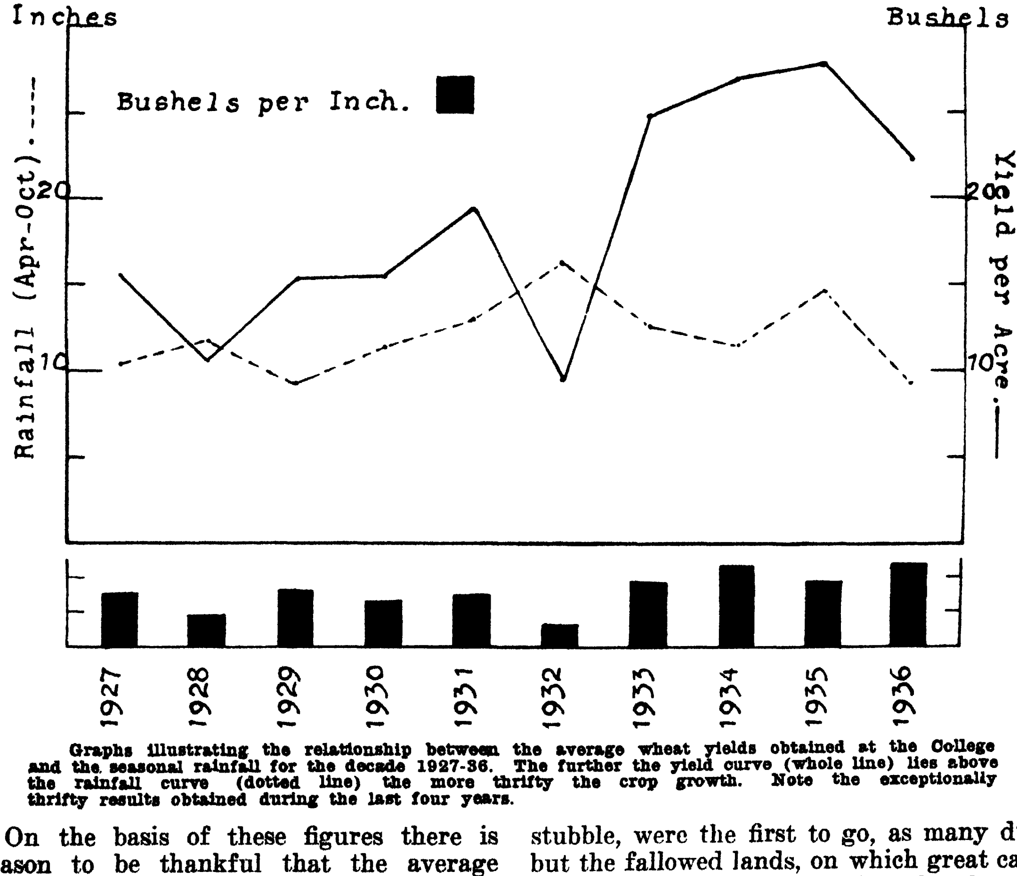
Year.	Seasonal Rainfall, April-October. Inches.	Average Yield per Acre. Bush.	Lbs.
1911............	9·41	14	17
1913............	9·61	6	32
1914............	4·85	11	28
1919............	8·17	9	22
1929............	9·24	15	11
1936............	9·22	22	8

On the basis of these figures there is reason to be thankful that the average yield over the farm was not considerably less.

For the sake of comparison the wheat growing results over the last decade, are given below, and portrayed on the accompanying graph. The latter shows to advantage the exceptionally good results obtained consecutively in the last four years.

ROSEWORTHY AGRICULTURAL COLLEGE.

Wheat Yields in Relation to Seasonal Rainfall, 1927-36.



Graphs illustrating the relationship between the average wheat yields obtained at the College and the seasonal rainfall for the decade 1927-36. The further the yield curve (whole line) lies above the rainfall curve (dotted line) the more thrifty the crop growth. Note the exceptionally thrifty results obtained during the last four years.

Other Crops.

The wheat crops, which finished so well, were all grown on fallowed land, and, in fact, very mediocre results to failure were experienced with other crops not grown on fallow. By September all crops were dwindling and withering in districts that had fared no better than the College, and for over a month farmers maintained that their crops would only stand another few days of dry weather. Oat crops sown on stubble, were the first to go, as many did, but the fallowed lands, on which great care and attention had been taken for 8 to 9 months prior to seeding, proved their unquestionable worth with a vividness that was at least pleasing to one who seeks such contrasts to convince. A common sight was the large field round which fallowing

Average Yields of Wheat on the College Farm for the Decade 1927-36, *in Relation to Seasonal Rainfall.*

Year.	Seasonal Rainfall, April-October, inclusive.	Average Yield per Acre.		Yield per Inch of Seasonal Rainfall.	
	Inches.	Bush.	Lbs.	Bush.	Lbs.
1927........	10·05	15	44	1	34
1928........	11·71	10	46	0	55
1929........	9·24	15	11	1	40
1930........	11·20	15	24	1	20
1931........	13·00	19	33	1	30
1932........	16·17	9	45	0	36
1933........	12·61	24	51	1	58
1934........	11·33	26	57	2	22
1935........	14·67	27	59	1	55
1936........	9·22	22	8	2	24

had been early and well carried out, but in which a patch of 20 acres, or more, had been left—betraying a shortage of sheep feed, and, incidentally, a lack of system in management and fodder conservation. The crops in such fields were uniform enough until August, but in September the advantages of the well fallowed margin over the poorly fallowed centre were strikingly illustrated. The clear cut value of good fallowing was here in graphic form that should have convinced the most seasoned unbeliever. The results obtained must have been in more striking contrast, as in the whole of the area where rainfall was low last year, stubble crops were either comparative or complete failures in contrast with those grown on fallowed land. This applied to College crops no less than to others in districts of similar plight.

Oats.—The oat crops grown on fallow yielded satisfactory returns, but one field of 110 acres sown on pea-stubble land had serious competition from soursobs during establishment, which, combined with the very dry conditions in August and September, left it in a hopeless condition. Hopes of its recovery were abandoned during September and it was grazed out. As a grazing proposition the crop proved very valuable at a time when paddock feed was very low, so that it could not be counted a complete loss.

The remainder of the oat crops yielded only the poor return of 13bush. 1lb. over an area of 82 acres. Of these, all were grown on fallowed land, with the exception of a few small stubble areas, and all were grazed over in July. In such a season the grazing proved definitely deleterious as recovery rains did not follow, but normally oats, sown early, will stand grazing well, and, in fact, if let go through on fallow, under average seasonal conditions, grow too rank, lodge, and are subject to considerable loss at harvest time.

It is hardly fair to compare varieties, but the variety Fulghum, which the College has recommended solely for grazing, gave the best return; an area of 28 acres giving the average yield of 16bush. 9lbs. per acre. Other returns were Early Kherson, 15bush. 13lbs. per acre; Mulga, 10bush. 32lbs; New Zealand Cape, 6bush. 29lbs. and Guyra, 6bush. 16lbs., none of which is fair to quote against the varieties, as the nature of the season, and the facts that they were grazed and grown under different conditions, nullified the significance of the results. In addition, New Zealand Cape came in for severe frost injury at seeding, and, together with Guyra, suffered from wind damage later in the season.

Barley.—The story round the Barley crop is more dismal still. Seeding generally had been unavoidably delayed, and as a result it was July before any barley was sown. All the barley was seeded in Graingers B., which was leyland. This was ploughed up, harrowed and cultivated twice all in the two weeks prior to seeding. By the end of September the barley crop had had little more than an inch of rain since seeding; obviously only poor results were possible. To make matters worse the lucerne flea made skeletons of many of the leaves of this field and must have had a serious effect on the struggling crop. The net result was that from the field containing the varieties Prior, Roseworthy Oregon and Californian an average yield of 10bush. 8lbs. was obtained. Of the varieties, Prior gave the best return of 12bush. 19lbs. per acre.

Peas.—The pea crop fared little better than the barley. This was grown in Nottles C. on stubble land prepared and seeded at the end of June. Other small areas were similarly sown in portions of Dalys C. and the old oval. Before the October rains arrived the meagre crops had reached full maturity and could, in fact, have been harvested before the rains came in October. So that from seeding to ripening of this crop only a little over 3 inches of rain were received. To make matters worse frosts were heavy and did some damage when the peas were flowering.

Of the 110 acres sown to peas only 37 acres were harvested; these were only dealt with to meet seed requirements. From the area so harvested the low yield of 4bush. 28lbs. was obtained. The remainder of the area was grazed out by stock.

A striking feature of this pea stubble was the abundance and vigour of the feed which followed the October rains. There can be little doubt that peas, even though they might fail, as this crop did, have a very beneficial effect upon the soil, and lend vigour to any growth which follows them during the summer months.

Hay.—The total of 321 tons of hay gathered was insufficient to cover the normal seasonal requirements, but adequate supplies were still available from the 1935 harvest, to make up any deficiency in this regard. Of the tonnage obtained, 281 tons were made from sheaved hay cut from headlands, divisions and the taller portions of the crops. All the hay was very short, and yields, although low, were satisfactory considering that conditions militated seriously against hay returns throughout the season. An average yield of 1 ton 10cwts. 34lbs. was therefore, very good. In addition, 40 tons of loose hay were gathered in Ebsarys. This field had been shut out during the winter with the idea of turning subsequent growth into silage. Conditions, however, were far too dry to make silage of the fodder and it was cut with the mowers, cocked and stacked. An average of 14cwts. 23lbs. per acre was obtained from this area. This brought the total hay gathered to 321 tons at an average yield of 1 ton 6cwts. 62lbs.

Silage.—For the first time for many years no silage, whatever, was made, simply because fodder was not available. When the closed field Ebsarys, referred to above under the heading of Hay, had reached a stage fit to cut for silage, the fodder itself was too dry to make up successfully; this, combined with very dry weather at the time, made it imperative to abandon the idea of making it into silage. The fodder was accordingly treated as hay.

Although no silage was made in 1936, sufficient supplies were carried over from the 1935 harvest to fulfil the seasonal requirements and leave the position safe until the summer of 1937, by which time, provided 1937 is at least an average year, fresh supplies will have been ensiled.

Dairy Farm Competitions, 1936-7

[Murray Swamps District.]

[Judged by H. B. Barlow, Chief Dairy Instructor.]

The following awards were made in the Dairy Herd—combined with Farm Management Section of the competitions conducted by the South Australian Committee of the Australian Dairy Board.

FARM MANAGEMENT.

Position.	Competitor.	Lay-out, etc. 40	Sanitation, etc. 40	Records. 20	Total. 100
1	Goyder, W. G., Long Flat	38	36	14	88
1	Fromen, V. E., Jervois	36	35	17	88
3	Gale, W. T., Jervois	35	33	18	86
4	Wise & Son, E., Jervois	32	35	18	85
5	Baldock, J. W. E., Long Flat	36	34	12	82
6	Jericho, H. H., Jervois	34	30	12	76
7	Hutchinson & Eagle, Jervois	30	25	15	70

DAIRY HERD.

Position.	Competitor.	Breed and Dairy Type. 80	Condition, etc. 30	Sire Pure-Bred. 25	Ex Tested Dam. 15	Total. 150
1	Gale, W. T., Jervois	72	24	22	10	128
2	Hutchinson & Eagle, Jervois	70	22	20	15	127
3	Wise & Son, E., Jervois	70	24	20	10	124
4	Goyder, W. G., Long Flat	68	22	19	13	122
5	Fromen, V. E., Jervois	63	23	20	10	116
6	Rothe, A. E., The Point	70	23	21	—	114
7	Baldock, J. W. E., Long Flat	67	25	18	—	110
8	Jericho, H. H., Jervois	65	23	20	—	108

Wheat as a Foodstuff

In the course of a short Talk over the Wireless Broadcasting Station (5CL), Mr. E. M. Hutton, B.Ag.Sc. (Assistant Plant Breeder at Roseworthy Agricultural College) made the following observations on "Wheat as a Foodstuff."

Wheat is the most important member of the Grass family used for human consumption, other members of which come to us transmuted into beef and mutton. Through hybridisation, mutation, selection and cultivation an endless number of varieties and forms of wheat have been developed from two or three wild species of great antiquity. One of these species was among the principal food plants of the ancient Babylonians about 4,000 B.C. and the Chinese some 5,000 years ago. The development of wheat has followed closely the progress of civilisation, so that to-day about one third of the total human population are wheat eaters. There is such a wide range in the adaptability of modern varieties, that wheat is grown in every part of the world, and during every month of the year wheat is harvested somewhere. As the standard of living rises in the non-wheat eating countries—I refer in particular to the rice and millet eating population of Japan, China and India—the light porous wheaten loaf to which we are accustomed will gradually become the principal food.

Whole grains of all the common cereals contain about the same amounts of the various food constituents, and are rich sources of vitamins B and E, which are essential to normal life processes. One may ask, why the superiority of wheat over the other cereals? This is due to the unique ability of the wheat flour protein, or gluten, to become elastic on the addition of water. The proteins of barley, rice, and oats will not become elastic with water, while the gluten of rye, although it absorbs water, is far inferior to wheat gluten in elastic properties. As a result, wheat is the only cereal which will yield a flour, from which light porous loaves can be baked. In addition, wheat protein has been proved to be nutritionally superior to that of any other cereal.

The wheat grain consists of the outer covering, or bran, the germ which lies just underneath the bran and to one end, and the starchy endosperm which constitutes about 83 per cent. of it. During milling, bran and germ are separated from the endosperm which is then reduced to white flour. Since the two vitamins B and E, and 50% of the mineral matter are resident in the bran and germ, these food factors are removed. This has often been used as an argument in favour of wholemeal or brown bread, but it must be remembered that bread is a fuel food, and that deficiencies of white bread are more than made up in a normal diet by milk, eggs, fruit, and vegetables. Since yeast is a very rich source of Vitamin B, white bread made with plenty of yeast is not as deficient in this food factor as previously surmised. In additon, whole meal bread is much less digestible than white bread, and the bran of the former is likely to provoke gastro-intestinal disturbances.

In the past, stone mills—wind or water driven—were used for milling. These have now largely been replaced by power driven steel roller mills. When wheat is received at the mill, it is thoroughly cleaned and washed, and the brush of very fine hairs is removed by scrubbing. Its moistness is adjusted to toughen the outer coat of the grains, while leaving the starchy endosperm in a state suitable for grinding. In milling, the grain is passed through three or more steel break rolls with finely fluted surfaces, and which revolve in opposite directions at different speeds. The first roll splits open the grain, and the following breaks effect a more complete separation of the starchy endosperm in the form of gritty particles called "semolinas" and "middlings" from the bran or offal. A certain amount of flour is produced at each break, and this is separated by sieving. The various grades of semolinas and middlings are ground to flour by passing between smooth closely set reduction rolls.´ The flour is finally dressed by passing through fine silk screens. One hundred pounds of wheat usually yield about seventy pounds of flour.

The baking of flour into bread has, like milling, been revolutionised so that in large modern bakeries all the manipulations of flour and dough are carried out by machinery. In baking, flour is mixed with warm water, salt, and yeast, to make a dough of the required consistency, and this dough after kneading, is then left in a warm place at 76-80° Farenheit to ripen. During ripening the yeast 'ferments pre-existing sugars and sugars formed from the starch with the production of carbon dioxide gas and alcohol. In addition, the gluten is mellowed and its elastic properties greatly increased, so that the dough can rise and hold the gas formed. The ripened dough is divided into pieces weighing about 2lbs. 3½ozs. and these are roughly moulded and allowed to "recover" for 15 minutes, which is called a "proving period." Gas is formed during this period, and stretches the dough making it less solid. The dough is then moulded into the required shape, and put into warm tins, and allowed to stand for a further proving period, until the dough is thoroughly inflated before baking.

Bread baking takes place at a temperature of 400-600° Farenheit, and takes 1-1½ hours. When the dough enters the oven, it quickly rises to the familiar loaf size, due to expansion and rapid production of gas. During baking, the alcohol escapes in the oven steam, and the gluten is coagulated, while the starch is gelatinised. The gluten and starch form a porous network which stretches and holds the gas, thus allowing a well risen loaf to be made. In weak flours the network of starch and gluten is weak, and will not stretch easily, so that the gas is lost and a poorly risen loaf results. The bloom or glaze on the crust is produced by the action of oven steam on the starch, while the colour of the crust comes from the caramelisation of residual sugar. On leaving the oven, the bread is properly cooled to prevent the crust from becoming leathery.

Consumers demand a well shaped loaf of good volume with a delicately browned crust, and one which has a soft texture and a closely knit structure. In addition, we like bread to have a pleasing aroma and flavour, as well as having good toasting and keeping qualities. That this ideal is not always attained is frequently a source of annoyance. This is quite often due to the fact that the farmer supplies the miller with weak wheats in which the gluten is of poor quality. The farmer is not to blame, because the range of high yielding good quality wheats available is very limited. As a result, a great responsibility rests on such plant breeding stations as Roseworthy College. At present the College is engaged on an extensive plant breeding programme with the aim of presenting South Australia with a first class bread wheat.

The difficulties are many, but they are not, we hope, insurmountable and the production of the desired type should reflect favourably on the overseas demand for our wheat, as well as on the palates and digestions of Australian consumers.

Note.

The Imperial Bureau of Plant Genetics: Herbage Plants: has recently initiated an addition to its series of publications which should engender an immediate response from all who are interested in maintaining records in good order.

Herbage Abstracts beginning with Vol. 7, No. 1 (March, 1937), may be obtained printed on one side of the paper only. The pages of this special issue can be cut up by abstracts and each abstract mounted on an index card, thus saving typing a copy. The arrangement of abstracts under sub-headings of the three major groups of Herbage and Forage Plants, Plant Biology, and Agronomy facilitates the setting up of the card index reference.

Naturally such an issue costs more, but it is quite reasonable, for so useful a publication, at 20s., a price which also includes Herbage Reviews printed in the usual way.

B. T. Dickson.

The Red Legged Earth Mite

In October, 1934, Mr. D. C. Swan, M.Sc., of the Waite Agricultural Research Institute, contributed an article to this "Journal" on the Red-Legged Earth Mite. Mr. Swan recently supplemented the foregoing by a Talk through 5CK Wireless Station, dealing with the mite as a garden pest.

The Red Legged Earth Mite has in recent years become increasingly common in certain of the wetter parts of South Australia; it may in some places be one of the most troublesome winter pests of garden plants, and of some field crops, such as peas.

Mites resemble insects in many respects. They feed in much the same way, and lay eggs; they are, however, actually more closely related to the spiders, and have four pairs of legs instead of three pairs.

The Red Legged Earth Mite is a small velvety-black creature with a rounded body about 1m.m. long; its four pairs of legs are red in colour. The front pair of legs is longest, and is used to some extent as feelers. The mite is easily found where present, feeding in groups on the leaves, or running actively about on the soil surface. When plants are disturbed, the mites immediately fall from them.

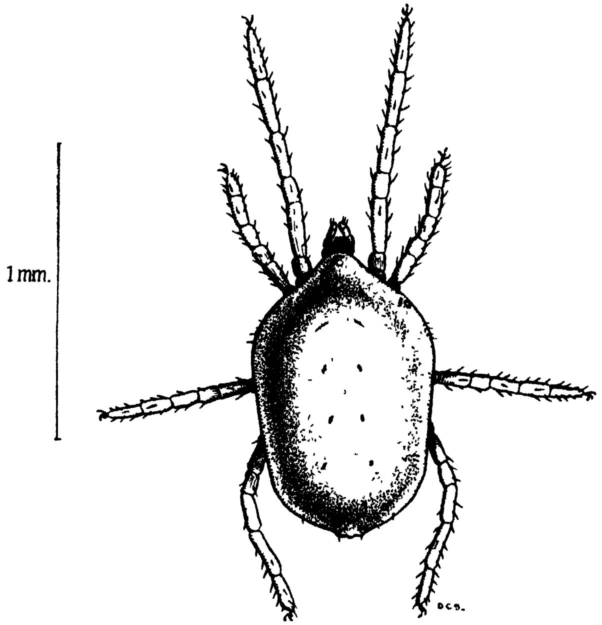


Fig. 1.—The Red Legged Earth Mite (*Halotydeus destructor Tucker*). Adult female. The body is velvety black, and the legs bright red.

The first published record of this mite was from South Africa, where it was reported in 1908 to be a pest of vegetable gardens. By 1917 it had made its appearance in Western Australia; it was probably introduced from South Africa in ship ballast. By the year 1921 it was known in Victoria, and it had come under notice in South Australia by 1925. It was at that time found mostly in the South-East, but it has continued to spread, and is now to be found in most places that are suited to it in the agricultural areas of South Australia. It is now known to occur in all the Australian States except Queensland and Tasmania. How it reached all these places is not known; it was perhaps introduced direct from South Africa at several distinct points on the Australian coastline.

The mite feeds by sucking sap from plants. It attacks a variety of soft-leaved market crops, and many of the common vegetables that we grow may be damaged by it. When the mites feed, they produce silvery or whitish patches on the leaves; such leaves when held up to the light are, however, opaque. The lucerne flea, which is often present with the mites produces areas of damage on the leaves that are quite transparent. Leaves that are heavily fed on by the mite wilt, and may shrivel and go brown. Plants which are exposed to constant attacks remain stunted and do not make the growth that is to be expected of them nor do they produce normal yields. The leaves that are nearest to the ground are damaged most.

The following are some of the plants most readily attacked by the Red Legged Earth Mite; peas, beans and their relatives, potato tomato, and in some cases tobacco. Tomatoes grown under glass near Adelaide are often attacked. Lettuce and silver beet are much favoured; of field crops, field peas are often injured, while clovers may be damaged at times. Grasses are not much attacked, nor are shrubs or most perennials. Many garden annuals such as sweet peas, violas, and *Ranunculus* are also readily fed upon. Most damage is done to plants while they are in the seedling stage; the mites attack the young shoots as soon as they appear above ground, giving them little chance to become established. Newly transplanted seedlings are injured in the same way, and require special protection. Older plants can withstand attacks, and once established, usually produce some sort of crop in spite of them.

The Red Legged Earth Mite is a winter pest only. It is not to be confused with the red spider, another small sap-sucking mite which is mainly a summer pest nor with the *Bryobia* mite, or so-called red mite of fruit trees, which is again active in the summer months. The eggs of the earth mite occur in the soil, and hatch only after the the soil has been thoroughly moistened by the autumn rains. Young mites appear sometimes in April or early May, according to the season. Several generations of mites occur through the winter and spring, but as soon as summer approaches, they die out. Eggs laid at this time fail to hatch because the soil has become too dry; they survive throughout the summer, and hatch again in the following autumn. The ability of the eggs to withstand the summer is important, for, although the mites appear to die out at the beginning of summer, the eggs carry through until conditions become favourable again.

The eggs are oval, bright orange in colour and each mite lays 50 or more. They are always laid on the underside of leaves, to which they are attached. Leaves just touching the soil surface are selected for this purpose. Thus the lowest leaves of Cape Weed, Milk Thistle, and Salvation Jane provide excellent shelters for the eggs, and these are much used. This is one of the reasons why weed control is a valuable aid to keeping the mite in check. The eggs hatch in four or five days in wet cool conditions, and the young mites, which are almost invisible to the unaided eye, begin feeding on suitable food plants. They pass through several stages, each of which resembles the adult except in size, and then, in about four weeks, become full grown. It appears that eggs develop best on well-drained sandy soils; thus mites are commonest and most troublesome in coastal areas, and on alluvial soils along rivers. They do not thrive on heavy clay soils, and are are not pests under such conditions. It may be added that moist conditions are essential for these mites to thrive; they always select damp places in which to lay eggs, and retire to such places on hot sunny days. Soon after the soil surface dries out, the mites perish, and no more are seen until conditions become favourable again.

And now let us see what is the position regarding the control of this mite. Like other mites and insects, the kind of weather plays an important part in regulating the numbers in which it is present. In dry winter it may be much less abundant than in a wet winter, while a late onset of the winter rains or an early summer, will also cut short its period of activity.

No natural ememy of the mite is known; some of its fellow inhabitants of the soil surface doubtless take some toll, but none is of any importance.

Mention has been made of the preference of the mites for certain weeds as places in which to lay eggs. Of these the Cape Weed is specially favoured; it is possible that in its original home in South Africa, this plant is closely associated with the mite, for both are introductions to Australia from the same region. When garden plants are grown near patches of weeds, mites breed in these and flock to and fro from the vegetables. The destruction of all weeds as far back as possible from a crop is thus a very necessary beginning to any control measures. An open-growing market crop provides little shelter for eggs. This is particulary so with glass-houses; the mites breed outside, and enter them only to feed.

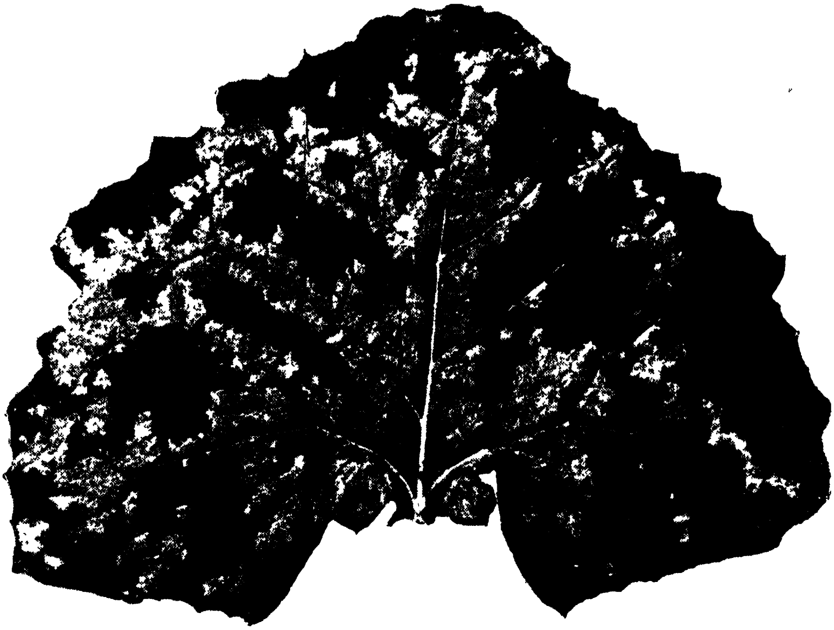


Fig. 2.—Leaf of Milk Thistle showing damage caused by Red Legged Earth Mite. This leaf is still opaque when held up to the light.

Control by sprays is practicable in small areas such as market or home gardens. It has been pointed out that the mites do most damage to small plants. Where control measures are undertaken the object should be to check the mites until the plants have had time to establish themselves. The plants can usually withstand latter attacks, especially if assisted by an occasional further spraying.

The mites are not easily wetted by sprays, because of the velvety surface of their body; they are thus rather difficult to kill. The most useful spray at present known is one containing nicotine or tobacco wash. Soap should be added to such a spray to increase its wetting power.

Another spray that may be used is lime-sulphur, but here again a suitable wetting agent should be added to the spray. Sprays may need to be applied weekly until seedlings become established.

In large areas of plants such as field crops or pastures, suitable control measures are obviously difficult. The planting of such crops on well-worked clean fallows is one method which may help; over-summering eggs are thus allowed to hatch and die before a crop is planted. Damage to clover pastures may be reduced by proper management; this involves the establishment of a suitable mixture of pasture grasses with the clover.

To repeat what has been said about control in gardens of this rather difficult pest, weed control, and judicious spraying to allow plants to become established, are the most useful and economical methods that can at present be suggested against it.

Danish Pig Industry

The accompanying interesting remarks on the Pig Industry of Denmark have been extracted from a report of the Agent-General and Trade Commissioner (Mr. C. F. G. McCann).

Denmark's prosperity depends just as much upon the pig and dairy industry as does Australia upon wool and wheat. Some twenty or thirty years ago, the Government of this country thoroughly investigated the possibilities of development of an export pork and bacon trade with England, and very wisely decided that the first essential step to progress was first to ascertain the British consumers' requirements. This having been done, the next question to be reviewed was the breeding of the type best adapted to provide English buyers with what they required. The choice fell upon Large White and Landrace, and in order to secure uniformity of type and conformation of the Danish pig production, all other breeds were practically debarred from being bred. At a later stage, and as the industry progressed and developed, the Government installed test stations, where detailed reports upon best methods of feeding and rearing were made available to all farmers engaged in the industry. These tests continue even to-day, despite the wonderful development that has taken place in the Danish pig industry and the striking success of her production of the type of pig so sought after on Smithfield and other English markets. The tests to-day no longer apply to the relative qualities of breeds, because the development by selectivity of the Landrace and its Large White cross breed in the earlier stages of the pig and bacon industry has practically led to the Landrace breed being universally accepted as the best procurable for the yield of early maturity pigs, whose freedom from disease make them profitable, especially when one takes into consideration that their litter percentage is satisfactory, and that their conformation complies with modern butchering trades requirements. The Landrace may be referred to as the "Dachshund" of pigs, by reason of the fact of its extraordinary length. This most important feature and obvious fact was the first thing that impressed me when I was viewing some hundreds of pigs of this breed quite recently in Denmark. There is an extreme lightness of shoulder, a complete absence of jowl, the top and underline are straight and level, and there is no suspicion of legginess very often associated with other breeds, and which tends to mar the carcase outlines when displayed on hooks at Smithfield.

When dressed, the long lean sides of bacon that typifies the Landrace breed are extremely attractive. I saw some hundreds of split sides in a drying room adjacent to a slaughter house, and was struck by the complete absence of any irregularity in size or shape. Nearly every carcase was identical in weight, and the majority that I looked over would average just over 60 kilos (133lbs.). Another outstanding feature was the silky texture of the rind, and its extreme smoothness attributed greatly to the fact that "singeing" is considered compulsory. The Danish authorities claim that singeing not only sterilizes the rind, but improves the quality of the bacon by reducing the rind to the same consistency and ensuring greater and more even pickle penetration and flavour. The pigs are first stunned with an electric appliance, and then elevated for sticking and bleeding on a chain conveyor. After scalding, the bodies pass through a dehairing machine, and thence slide down a rail leading into a singeing machine, where they spend about 20 seconds, subjected to intense heat, and emerge quite black and charred. Warm water is immediately sprayed over the carcases, and coarse brushes are used to remove the first traces of discolouration. Further cleansing operations are carried on as the carcase slides down the rail by men with broad blunt knives, who remove every trace of the black, charred discolouration which singeing causes, and in doing so, completely remove all irregularity in rind formation, as well as hair stubs, resulting in a white, mellow, attractive rind colouring.

Disembowelling and veterinary inspection takes place immediately afterwards, and then the carcases are split, operators working from the back to permit of the backbone being entirely removed (a very skilful operation). The carcases, after being split in sides, remain in a natural-atmosphere drying room overnight, and then spend sufficient time in a chilled room to ensure a uniform reduction in the bone temperature of the pork before pickling. All bacon is first pumped before submersion in pickling vats for 96 hours. In the pickle and store rooms, the greatest attention is paid to cleanliness, and disinfection is rigorously insisted upon and carried out in spray form. The pickle, after use, is pumped for filtration, reconditioning, and analysis, to ensure the requisite strength and freedom from any impure cultures, so prone to develop in the treatment of bacon and affect the flavour of the finished product. After pickling, the sides are removed to a storage room where they are stacked to drain thoroughly before exportation.

Many of these bacon factories, which are practically all co-operative, and, in consequence owned by the farmers themselves, also include egg packing as a bi-product trade. The farmers bring in the eggs when they deliver their pigs, and the works grade, pack and dispose of them. Each individual farmer has his own number stamped on all eggs produced by him for identification purposes. Intense tests in food stuffs for pig production continue to be carried out, but so far nothing of greater utility is recommended than skim milk and grain.

Danish pigs, owing to climatic conditions, are housed practically all the year round, and some very educative and interesting data have been compiled relative to the advantages of various designs of pig houses, as well as central heating and ventilation. Altogether, it can be truly said that the success of this great industry in Denmark has been due to the fact that science has been allied with sound practical experience.

The feeding question has been tackled in the same scientific and businesslike manner. To-day, other countries copy Denmark's methods, but none so far have succeeded in emulating the wonderful uniformity, the quality and universal acceptability to the trade that her bacon and pig products have long ago attained.

To those interested in the development of the pig industry in Australia, nothing is of greater interest than a visit to the farms, studs, and killing and bacon-curing factories of Denmark.

Parafield Egg-Laying Competition, 1936-37.

The supplement to this issue is a complete report of the Egg-Laying Competitions held at Parafield during the year ended 31st March, 1937. The Chief Poultry Adviser (Mr. C. F. Anderson) reviewed the results of the competition briefly in the April issue when he pointed out that the scores throughout the test were particularly good.

The leading single bird for the whole of the Competition was a White Leghorn, owned by Mr. C. A. Maxwell of Aldgate, the total number of first grade eggs laid being 266.

A general summary of the results of the Competition shows the following:—

Number of birds that completed the test	468
Average number of eggs laid	198

Averages of Various Breeds Competing.	Birds.	Total No. of Eggs Laid.	Average No. of Eggs Laid per Bird.
Wet Mash Section—			
White Leghorns	326	66,329	203·52
Black Orpingtons	44	8,658	196·77
Home Project	27	5,493	203·44
Barnevelders	5	1,046	209·20
Minorcas	15	1,813	120·86
Rhode Island Reds	27	4,448	164·74
Dry Mash Section—			
White Leghorns	13	2,695	207·03
Rhode Island Reds	6	1,297	216·16
Black Orpingtons	5	919	183·80

	s.	d.
Average cost of food per bird	6	9·6
Average return per bird	17	7
Return over cost of feeding	10	9·4

Tobacco Growing

"Tobacco Growing in South Australia is slowly but surely developing into an industry of considerable importance to the State" were the opening remarks of an address by Mr. R. E. Courthope-Giles, Tobacco Instructor, over Station 5CL, on the Development of the Tobacco Growing Industry in South Australia.

Although South Australia was as yet but a small producer, it was realised that there was undoubtedly room for a considerable amount of expansion. It was only during the past few years that the value of such an industry to the State had been realised, and that any attempt made to produce tobacco upon commercial lines.

In the initial stages, unfortunately, boom conditions prevailed and many of those who pioneered the industry seven years ago, had no hope of success owing to unsuitable soil or climatic conditions. The lack of experience in handling such a crop as tobacco, proved to be a grave drawback to growers, many of whom were unsuited to this type of work which was highly specialised.

Like every other business a certain amount of capital was required to provide the necessary plant, and to cover working expenses. In many cases the resources of growers were totally inadequate for such an undertaking.

With the aid of the Federal grant made to South Australia during the past three years, a considerable amount of valuable experimental work had been carried out by the Department of Agriculture.

Particular attention had been given to the location of suitable tobacco growing areas, and the types of soil found there, which were capable of producing a tobacco suited to present day market requirements.

The Adelaide Hills, and the South-Eastern portion of the State, in close proximity to the Victorian border, contained possibly, some thousands of acres of land suitable for tobacco growing. The average annual rainfall varied, however, from 26 to 40 inches.

Small experiments were being conducted in the Murray Irrigation Areas, in the Stansbury scrub on Yorke Peninsula and in the vicinity of Tintinara. It had been definitely proved that bright tobacco with excellent smoking qualities could be grown in these comparatively dry localities, provided that facilities were available for irrigation, and that the crops were adequately protected from the high winds.

The climate of South Australia was such that wind breaks were essential for the protection of tobacco crops grown anywhere in the State. In the past, whole plantings had been destroyed by sand drift, good leaf broken to tatters, or the texture ruined by constant dry winds, all of which loss to growers was avoidable, and which, it was hoped, would not be permitted to occur again. Tobacco was far too valuable a commodity to warrant such unnecessary risks being taken.

Suitable land was being located in the Southern portion of the Adelaide Hills, considerable expansion was taking place, for growers in the Hills had experienced quite a successful season and others were obtaining sufficient confidence to undertake this somewhat exacting form of agriculture. The greatest difficulty facing the industry from the point of view of disease, had always been Downy Mildew or Blue Mould as it was more commonly known.

Once the plants had been transplanted from the seed beds out into the fields, this disease, as a rule, did but little harm in South Australia. Thanks to the discovery of the Benzol gas method of raising seedlings, by officers of the Council for Scientific and Industrial Research, the difficulty at this stage had been entirely overcome. The South-East, however, experienced a severe outbreak of field infection from Blue Mould during the past season, due to the exceptionally cold and wet weather prevailing during December and January in that part of the State. Growers should remove every known source of infection, destroy all plants after harvesting had been completed, fallow their land and keep a sharp look out for self-sown seedlings, and burn or bury them immediately.

The severity of the outbreak in the South-East was partly due to the zeal displayed by growers in attempting to grow the lighter types of Virginian leaf in preference to the Dungowan variety which had always shown great resistance to field infection from Blue Mould and which had always given satisfactory results hitherto.

Tobacco at Loveday, protected by breakwinds.

The remarkably satisfactory results obtained with Benzol in the raising of seedlings made all concerned over-confident of success, and from now on it would be our aim to produce a brighter, better textured Dungowan leaf giving the same resistance to disease. Fortunately the aspect of disease-resistant plants had not been overlooked, and the Department was now in possession of sufficient Dungowan seed of improved quality obtained from disease-free sources to supply all the growers in the State with sufficient for their requirements in the coming season.

While fully aware that crops might become infected in the field after having been grown under Benzol gas fumes as seedlings, we were confident that the Dungowan Improved Variety would give growers satisfactory quality with a high degree of disease resistance, and it was to be hoped eventually to obtain complete immunity.

Growers were at present engaged in the grading of the leaf, and preparing for the advent of the buyers who would be visiting the State early in August. The importance of good grading could not be exaggerated. Leaf which was bulked after curing, should first be examined, and all green, immature, frosted and inferior broken leaf discarded. The first three named were unsaleable, and inferior, dark, or badly broken leaf would not pay for handling.

This operation would greatly facilitate the grading of bright and mahogany leaf into their various grades. It was also important that leaf should be graded for size as well as colour. As the industry developed, the qualities of texture and elasticity would also have to be taken into account.

After grading, the leaf must be tied into hands of uniform size and quality with the butts not greater than one inch in diameter, the tie-leaf being of similar quality to that tied in the hand, and firmly secured. Leaf should be baled in as dry condition as possible without breakage, to prevent darkening, heating or mould setting up. New 14oz. hessian was required for baling. Bales should be stored under dry conditions and with as even a temperature as possible, light being excluded to prevent bleaching.

Caps should not be sewn on to the bale ends until the leaf had been purchased by the buyers, and should, therefore, be constantly examined by growers for excess moisture, which was readily taken up by cured tobacco leaf.

The recent formation of a Federal Tobacco Advisory Committee, a growers' organisation, was an event of considerable importance to the industry. Two delegates appointed by each State of the Commonwealth, met recently in Melbourne and discussed various problems confronting tobacco growers. The South Australian representatives were Mr. E. J. Webster of Mount Compass, and Mr. R. G. Morphett, Chairman of the Adelaide Hills Tobacco Growers' Association.

An organisation of this kind, with the backing of growers throughout the Commonwealth, should greatly assist the development of the industry upon sound lines. It should now be possible to improve the quality of Australian tobacco by the standardisation of grades, the elimination of inferior leaf from the market and uniformity in marketing methods.

There was a ready market for good leaf at profitable prices. Australia was producing barely 25 per cent. of its requirements of tobacco, so there was room for expansion, but it was a young industry and there was room for a vast amount of improvement in method, particularly in the handling of cured leaf. Quality counted, and improved quality would rapidly create the increased demand so earnestly desired by growers.

Review of the Competition for the Month of June.

[By C. F. Anderson (Chief Poultry Advisor) and A. Clifton (Competition Attendant).]

The scores for the month of June are not up to the average recorded for June 1936, being equal to 47.4 as compared with 54.7 for June last year. The lay, however, shows an increase of 6 per cent. on that of May. The biggest increase in production has taken place during the latter half of June, and it closely coincided with the period of fine weather experienced during that portion of the month.

The Light Sussex pullet entered by Mr. H. H. Gallagher of Pooraka is still in top position for the whole of the competition, with a score of 68 first grade eggs. She is, however, only one egg in front of the Rhode Island Red entered in the Home Project Utility Section by Master Keith Johnson, of Two Wells. This bird has laid 67 first grade eggs. A Langshan owned by Mr. T. Smallwood has also laid particulary well during June, laying 27 eggs for the 30 days, but unfortunately, among these were many eggs which failed to reach the required weight.

The best perfomance in the Soaked Grain Section was that of an Orpington entered by Mr. V. F. Gameau. This bird laid 26 eggs in the 30 days, including 1 sequence of 9 eggs and another of 8 eggs. All these were 2ozs. in weight, and a number of them were 2¼ to 2¼oz. eggs. Another good sequence was recorded by a Black Orpington entered by J. Beaglehole in the Home Project Utility Section. This bird was broody in the early part of the month, but she commenced laying on the 7th and recorded a sequence of 19 eggs in 19 days, but unfortunately went broody again.

One death was recorded for the month, making a total of 2 since the commencement of the competition.

The percentage of first grade eggs was particulary high, being 92.6 per cent. of all eggs laid for the month.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate matter concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements af the stock.

Test.	Total Eggs Laid from 1st April, 1937, to 31st May, 1937.	No. Eggs Laid for the Month of June, 1937.	Total Eggs Laid from 1st April, 1937, to 30th June, 1937.
A	963	448	1,411
B	745	460	1,205
C	881	391	1,272
D	627	253	880
E	564	401	965

	Value of Eggs.		Cost of Food.		Return Above Cost of Feeding for June.	Total Return Above Cost of Feeding, April to June.
	April and May.	June.	April and May.	June.		
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
A	6 3 9	2 12 1	2 5 9	1 1 1	1 11 0	5 9 0
B	4 15 8	2 13 6	2 4 5	1 1 0	1 12 6	4 3 9
C	5 12 11	2 5 6	2 6 6	1 1 1	1 4 5	4 10 10
D	4 0 10	1 9 5	2 5 3	1 2 6	0 6 11	2 2 6
E	3 12 8	2 6 8	2 5 8	1 1 9	1 4 11	2 11 11

Agricultural Bureau of South Australia

Eyre's Peninsula (West)

The Eyre's Peninsula (West) Conference was held on 7th July at Ceduna, under the auspices of the Maltee Branch (Mr. E. Schwarz, Secretary).

Branches in the neighbourhood of Ceduna were represented by over 60 delegates during the day sessions.

Mr. J. W. Bassham presided and the Hon. A. L. McEwin (M.L.C.) chairman of the Advisory Board of Agriculture delivered the opening address.

The following papers were read:—Erosion of Soils (Mr. V. B. Schwarz, Maltee); Fodder plants that would prove useful for increasing the stock carrying capacity of the district (Mr. M. Lowe, Laura Bay); The Care and Working of the Farm Team (Mr. E. L. Miller, Mudamuckla).

Mr. C. A. Goddard (Asst. Instructor to the School of Mines) addressed the conference on The Wool Industry.

A number of veterinary questions were answered by Mr. A. H. Robin (Veterinary Officer, Stock and Brands Department), and Messrs. R. C. Scott (Chief Agricultural Adviser, W. H. Brownrigg (District Agricutural Adviser) and H. C. Pritchard (General Secretary) assisted in discussions on various items included in the agenda.

Resolutions were carried on subjects dealing with better facilities for obtaining water in the district and subsidies for crop competitions. The next conference will be held at Ceduna by arrangement with the Laura Bay Branch.

In the evening Mr. Scott addressed a large audience on a visit to New Zealand.

River Murray Fruit Growers' Conference

Branches of the Agricutural Bureau in the irrigated fruit growing areas of the River Murray held their Annual Conference at Waikerie on 17th June.

Mr. L. W. Andrew presided over an excellent attendance of delegates from Renmark, Renmark North and Chaffey, Ramco, Berri, Kingston, Monash, Barmera, Moorook and Waikerie and the Conference was opened by Mr. J. B. Murdoch (Member of the Advisory Board of Agriculture).

The following papers, which were of a very high standard, were read, and aroused instructive discussions:—"Frost Combating at Waikerie," by the Frost Prevention Committee of the Wakerie Branch; "Insurance Cover Against Climatic Damage," Mr. F. B. Harden (Waikerie); "Deep Sump and Bore Drainage," by members of the Waikerie Branch; "Drainage Systems at Barmera," by members of the Barmera Branch; "Vine Culture in Relation to Baume Tests," Dr. W. E. Meier (Renmark); "Interesting Aspects of Fruit Growing," Dr. C. H. Nicol (Waikerie); "Soil Treatment and Citrus Growing," Mr. L. A. Chappel (Berri); "Cincturing," Mr. C. Grasby (District Horticultural Adviser). Included on the agenda were a large number of questions, which were answered by the Chief Horticulturist (Mr. A. G. Strickland, M.Sc.) and other officers of Department.

Conference carried the following resolutions:—"That the matter of insurance of crop losses be referred to the Advisory Board of Agriculture to explore along the lines suggested in Mr. Harden's paper"; "That when the Research Council completes its survey, it should be asked to extend its work to cover greater depths of soil in order that blockers may have information available in locating sites for deep sumps and bores"; "That the Government be requested to take steps to have the analysis of sulphur printed on the bags."

It was decided that the 1938 Conference should be held at Berri.

During the evening session, Mr. Strickland delivered an address in which he dealt with several aspects of citrus culture.

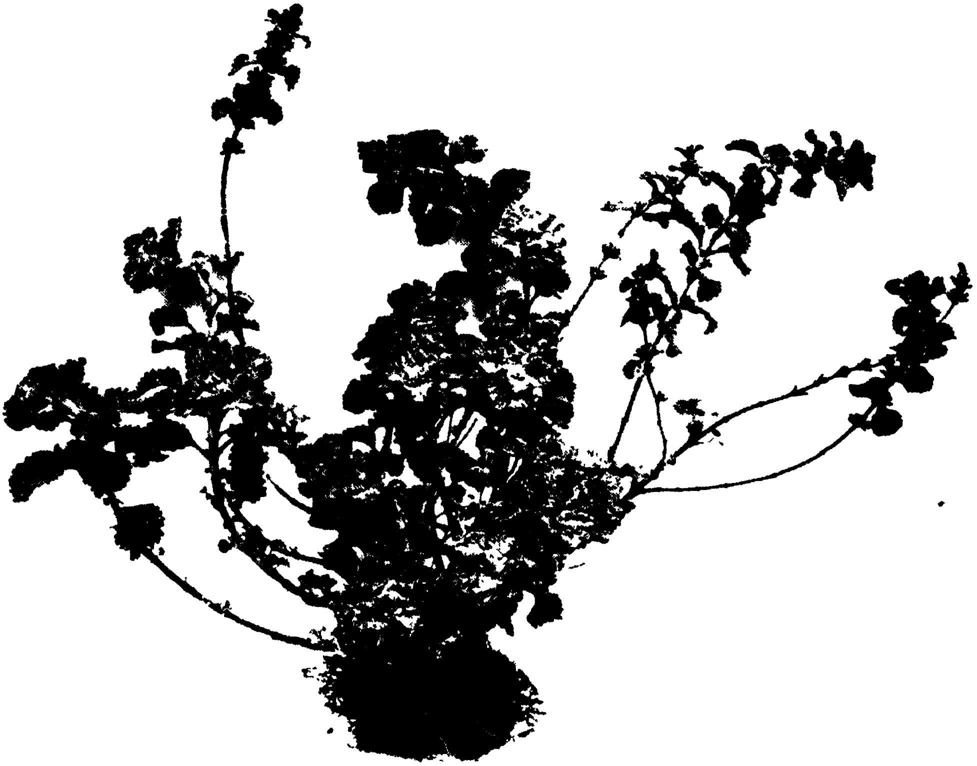
Acknowledging a vote of thanks, which was accorded to officers of the Department of Agriculture and those who had contributed items to the agenda, Mr. Murdoch expressed, on behalf of the Advisory Board, his pleasure at the success of the Conference—"one of the best that has been held along the River for many years." He extended congratulations to the Waikerie Branch for the excellent organisation of the proceedings and said it reflected great credit on the officials of the Branch, and especially its energetic Secretary, Mr. F. B. Harden.

Important Weeds of South Australia

[By G. H. Clarke, B.Sc., Botanist, Waite Agricultural Research Institute University of Adelaide.]

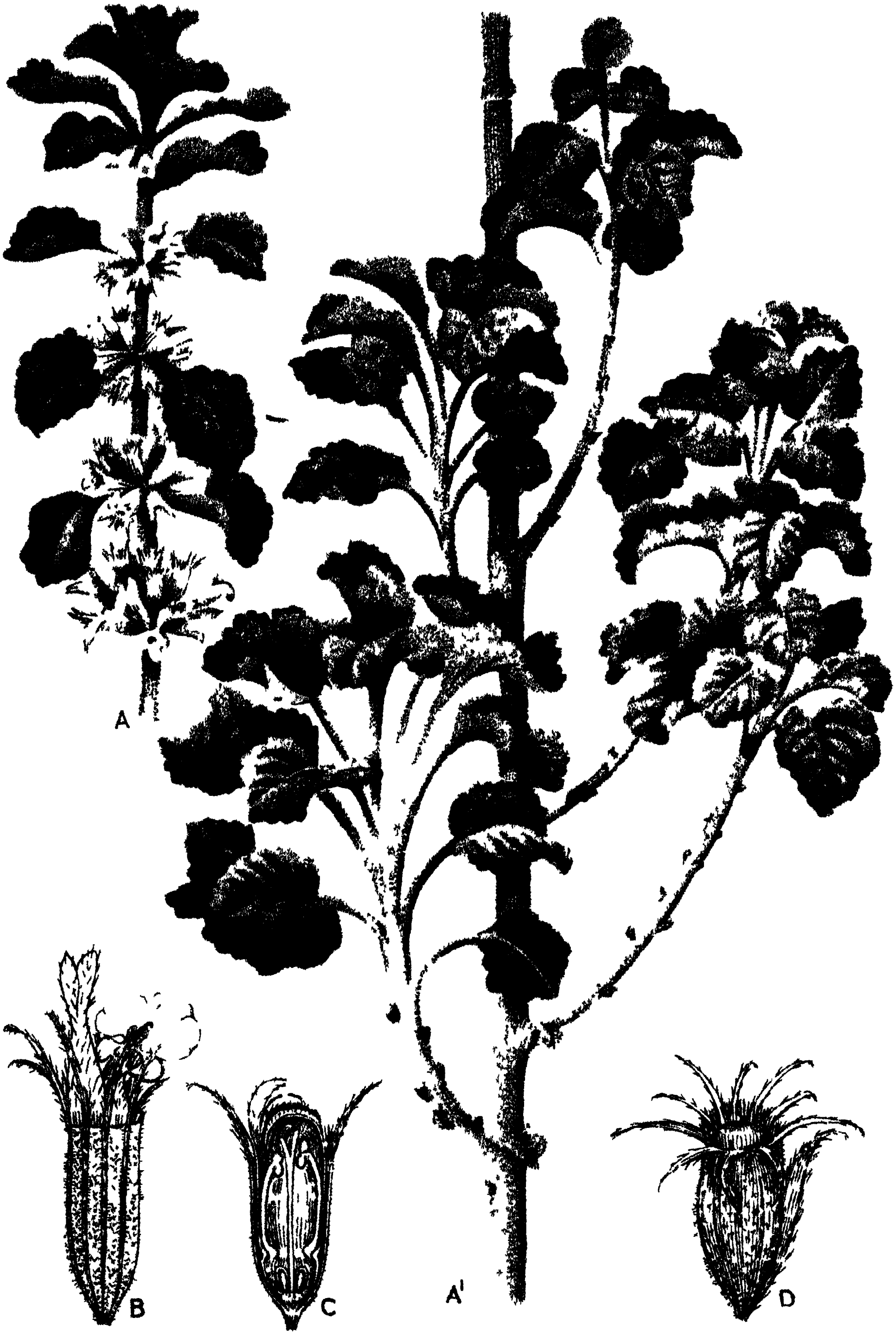
No. 21.—HOREHOUND (*Marrubium vulgare* L.).

Horehound is a weed which is becoming increasingly important in South Australia, where it already enjoys a wide distribution. It is a perennial herb growing to a height of from one to two feet, and can be easily recognised by its bluish-green crinkled leaves, and by its stems, which are often white in colour, due to a dense covering of hairs. Like very many other noxious weeds it is an introduced species, and, though native originally to Europe and Asia, has become naturalised in many other countries, including most States of the Australian Commonwealth. It occurs mostly on uncultivated ground: along roadsides and stock routes, on waste land, and especially in situations where sheep congregate or are travelled. The ease with which Horehound is spread by sheep is one of the main reasons why the plant should be regarded seriously as a weed, for it is undoubtedly spreading and increasing in density in the State through this agency.



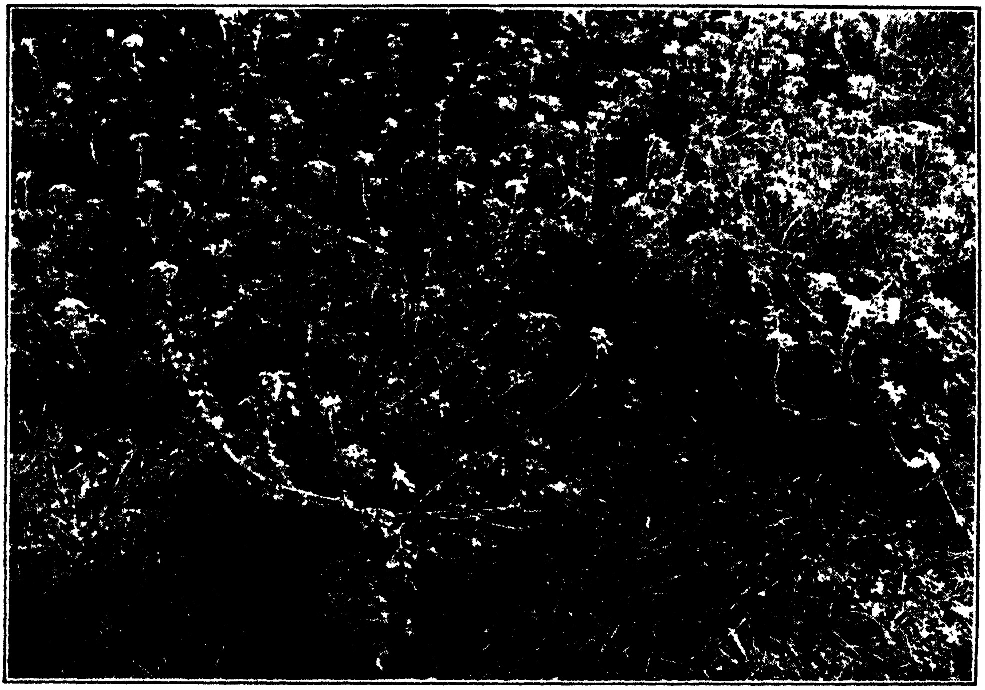
Horehound (*Marrubium vulgare* L.). (*See coloured plate opposite.*)

The flowers occur in dense clusters, subtended by bracts, at the nodes of the branches, and the latter thus form what appear to be interrupted leafy spikes. Each flower is enclosed in a calyx, produced into slender teeth covered with



HOREHOUND (*Marrubium vulgare, L.*)
A.—Flowering branch. A1.—Vegetative branch (about half natural size). B.—Open flower.
C.—Flower in median vertical section. D.—Fruiting stage showing recurved teeth of calyx.
(B., C. and D. enlarged.)

bristles. These teeth become strongly reflexed after the petals have fallen and the seeds are ripe; and they readily attach themselves to the wool of sheep. By this means the fruiting calyces, containing the seeds, are spread from place to place. These seeds germinate very readily, especially in places where the sheep have been resting, and the resulting plants, being perennial, not only form fresh centres for seed production, but also hold their ground and continue to grow and spread locally in the new situation. Though it occurs in many places in South Australia, Horehound is still somewhat restricted as regards its distribution and density of growth in the districts where it is known to occur. Much can still be done, therefore, towards preventing it from becoming as widespread as certain other weeds, such as, for example, Wild Onion and Star Thistle, of which it is likely to become a serious rival if steps are not taken to check its growth and seed production.



Horehound growing by the roadside.

Horehound is known botanically as *Marrubium vulgare* L., and it belongs to the same family (*Labiatae*) as such well-known plants as Sage, Mint, Thyme, Rosemary, and Lavender. All of the latter species are aromatic, due to the presence of resinous oils, and this character applies to many genera of the *Labiatae*. But it does not, however, apply to all of them, and there are many, including *Marrubium*, which are not scented. Besides Horehound, the family includes a number of well-known weeds, such as Wild Sage (*Salvia Verbenaca*), Woolly Salvia or Ulooloo Cabbage (*Salvia Aethiopis*), Stagger Weed (*Stachys arvensis*), and Dead Nettle (*Lamium amplexicaule*). Members of the family usually possess quadrangular stems with opposite leaves, and tubular—often bilabiate—flowers arranged in apparent whorls or clusters at the nodes of the stems, and in the axils of the opposite leaves or bracts. The genus *Marrubium* is distinguished from other *Labiatae* by having a distinctly 2-lipped corolla, a 10-toothed calyx, and included stamens, which latter are four in number and have 2-celled anthers.

Description of Marrubium vulgare.—In the Flora of South Australia, *M. vulgare* is described by Mr. J. M. Black as follows:—

> Whitish-tomentose perennial, 30-80 cm. high; leaves petiolate, orbicular, 1-3 cm. diameter, irregularly crenate, wrinkled; false whorls many-flowered, axillary, compact, distinct; calyx 4 mm. long, tubular, 10-nerved, with 10 subulate, recurved teeth; corolla white, 2-lipped, the upper lip 2-lobed, erect, the lower 3-lobed, spreading; stamens 4, enclosed; anthers with 2 divaricate cells; nutlets obovoid, subtrigonous.

Horehound has been used medicinally as an ingredient of certain cough mixtures, and it is sometimes used for the preparation of home-brewed non-alcoholic beers. It is of no value as fodder, and, though not poisonous, has a bitter taste and is seldom eaten by stock. Where other feed is being grazed down, therefore, Horehound is left untouched and allowed to form seed without hindrance, the seed being subsequently spread by the movements of the animals.

The plant will grow on very poor soil, and has shown itself able, under certain conditions, to colonise bare ground from which the surface soil has been removed by erosion. The suggestion has been made that the plant might, therefore, be of some use in re-establishing vegetative cover in eroded areas, especially in view of its inability to compete successfully with certain pasture grasses. The difficulty here, however, is that competition, in order to be successful as a method of controlling weed growth, usually requires to be assisted by the sowing and manuring of the pasture and by controlled grazing: measures which are not always practicable in the situations where erosion is a problem. The use of noxious weeds in this way is not advisable if the effectiveness of their subsequent control is at all uncertain. Such plants tend to spread and take possession of the water courses. Some of the worst weeds in the State are already established in areas where the high ground is badly eroded, and occupy practically the only situations which might otherwise support useful pasture. There are, for example, some very dense infestations of Hoary Cress in low-lying situations in parts of the North, and the weed in almost every case occupies ground capable of supporting useful fodder species. The same might also be said of the Wild Onion and the Tobacco Bush.

The control of Horehound is not difficult on cultivated ground, nor is it to be regarded as a serious competitor of sown pasture species, given correct management. It is much more difficult to deal with in the case of infestations on roadsides, and on waste or neglected land. Prevention of seed production is important, but, since the plant is perennial, this is not sufficient to ensure eradication. Small areas should be dealt with by digging or hand pulling before the seed has been formed. Larger areas should, where possible, be ploughed up and cultivated, all subsequent growth being dealt with by hand pulling or by use of the hoe. Spraying with sodium chlorate (1lb. chlorate in 1 gallon of water) is also effective, provided that more than one application is given, and none of the plants is missed. It is especially important that new infestations should be quickly recognised and dealt with before they have become firmly established and allowed to form seed.

Production of Butter and Cheese.

The production of butter and cheese for April, 1937, was:—Butter, 757,482lbs.; cheese, 569,052lbs.

McLaren Flat Pruning Competitions

The Annual Fruit Tree and Vine Pruning Competitions conducted under the auspices of the McLaren Flat Branch of the Agricultural Bureau were held on the properties of Messrs. J. Ingoldby, R. Nottage and F. B. Wilson on 29th May.

The trophy presented by the Royal Agricultural and Horticultural Society for the competitor gaining the highest number of points in the Rod and Spur section was won by Mr. A. T. Leske of Williamstown.

Vine Section.

Judges.—Rod: B. Boehm (Light's Pass), J. B. Harris (District Horticultural Adviser).

Spur: G. Cox (Reynella); J. B. Harris (District Horticultural Adviser).

Currants: H. Howard (Langhorne's Creek); G. Dowdell, N. Low (McLaren Flat).

Competitor.	Rod.	Spur.	Total.	Currants.
A. T. Leske	97½	96	193½	—
F. Price	93	94	187	—
E. Strout	97	89	186	—
J. Dowdell	93½	92	185½	—
S. Maple	93	92	185	86
Ralph Townsend	95½	87	182½	91½
C. Sigston	90	92	182	92
P. Roe	94	87	181	85
F. Schurgott	96½	84	180½	—
Ron Elliott	94	86	180	86
A. Air	90	90	180	90
B. Elliott	93½	86½	179½	91
D. Nicolle	99	80	179	83
Reg. Townsend	90½	88	178½	89
S. Penney	93½	85	178½	91
K. Broughton	93½	85	178½	87
H. Eatts	97½	81	178½	87
C. T. Vinall	96	82	178	84
Lin. Ward	95	83	178	92
J. Francisschini	93	85	178	92
C. Air	94	84	178	93½*
L. Penney	94½	83	177½	93†
J. Sigston	92½	85	177½	91
N. Sparrow	90	87	177	—
P. T. Wait	82	95	177	92
F. M. Elliott	88½	88	176½	91
R. Sibley	94	81	175	—
H. Baldock	90½	84	174½	90
L. G. Osmond	91	83	174	—
R. J. Deane	90½	83	173½	89
B. Powell	92	81	173	88
R. Rau	93	80	173	91
I. Dyer	87½	85	172½	89
D. Broughton	90½	82	172½	88
Reg. Low	88½	84	172½	95½‡
W. N. Osmond	89½	82	171½	—
A. Trembath	88	82	170	87
Ron Ward	89½	80	169½	88
C. Bruce	91	78	169	91
Reg. Elliott	83	85	168	—
R. Bilney	86½	81	167½	91
C. Cassetta	89½	78	167½	86
A. Storer	90½	77	167½	—
A. Powell	88	79	167	91
C. Sparrow	84½	80	164½	82
Rex Ward	81½	81	162½	—
W. N. Parmenter	80½	80	160½	68
G. Ward	75	81	156	—
F. Holmes	76	77	153	—
K. Robertson	—	85	85	84
Ross Elliott	—	—	—	89

Fruit Trees.

Judges.—Messrs. R. Fowler (Manager Blackwood Orchard); E. Leishman (District Horticultural Adviser).

Competitor.	Apricot.	Prune.	Total.
Reg. Elliott	87	88	175
F. M. Elliott	90	83	173
D. J. Bain	85	87	172
A. T. Leske	83	87	170
W. C. Ledgard	88	82	170
G. Ward	80	89	169
P. T. Wait	82	86	168
Lin. Ward	84	84	168
A. Trembath	81	87	168
B. Elliott	86	82	168
J. Sigston	85	83	168
B Powell	83	84	167
Reg. Low	82	84	166
K. Broughton	80	86	166
D. Nicolle	81	84	165
W. R. Parmenter	81	83	164
Ron Ward	80	83	163
F. Penny	79	82	161
H. Eatts	—	90	90
C. Sigston	89	—	89
Ralph Townsend	—	82	82

* Second. † Third. ‡ First.

The Committee of the McLaren Flat Pruning Competition.

River Murray Pruning Championships

Three outstanding features marked the finals of the River Murray Pruning Championships which were held in Mr. L. W. Andrew's orchard at Waikerie on 1st July. First, there was the success of A. Milde of Mypolonga, who won the Fruit and Vine Sections, and also scored the highest aggregate points; secondly, the record number of entries that were received from Waikerie, Barmera and Moorook—a most encouraging feature; and thirdly, the number of young men who are commencing to work their way into the championship events.

It is also worthy of note that Messrs. Milde and Prosser left Mypolonga at 4 a.m. on a 100 mile drive to Waikerie in order to take part in the competitions and returned home after pruning.

Mr. E. Leishman, who has been judging the competitions for some years, says that the pruning has reached a very high standard along the River, and it is generally agreed that this is largely due to the influence of the competions. In the past, the competitions have been criticised because it was contended that the standard set by the Judges was too high, and that competition work was too slow to be of any value when done under commercial conditions. It can be definitely said that such is not the case, for Mr. Milde in the Apricot Section pruned a fairly large tree in 30½ minutes, and Mr. J. Virgo (Waikerie) one of the judges this year and a champion pruner of some years ago, said it was the best example of pruning of the apricot that he had seen along the River.

Results.

Judges:—Messrs. J. Virgo and F. Elliott of Waikerie, and E. Leishman, District Horticultural Adviser.

FRUIT TREES.

Competitor.	Branch.	Apricot.	Peach.	Pear.	Total.
A. Milde	Mypolonga	95	87	88	270
W. Boehm	Waikerie	92	87	85	264
F. Battams	Moorook	93	86	83	262
E. Prosser	Mypolonga	90	90	82	262
W. Harris	Berri	88	84	90	262
F. Fox	Berri	82	87	91	260
W. Rout	Berri	86	89	84	259
R. Isaacson	Waikerie	84	87	87	258
J. Boehm	Waikerie	80	89	87	256
S. Sanders	Moorook	85	81	85	251
R. Loxton	Moorook	85	79	84	248

VINES.

Competitor.	Branch.	Gordo.	Currant.	Sultana.	Total.
A. Milde	Mypolonga	88	91	107	286
C. Cutis	Waikerie	88	90	106	284
W. Harris	Berri	91	92	97	280
F. Battams	Moorook	85	90	103	278
F. Fox	Berri	88	87	100	275
R. Loxton	Moorook	89	88	98	275
R. Isaacson	Waikerie	85	89	100	274
C. Boehm	Waikerie	89	86	98	273
K Shepherd	Barmera	90	88	91	269
E. Prosser	Mypolonga	83	83	103	269
H. Tucker	Berri	88	82	96	266
J Simpson	Barmera	83	84	90	257
S. Sanders	Moorook	81	80	90	251

With scores of Fruit Trees—270, Vines 286—an aggregate of 556, Mr. A. Milde thus wins the trophies donated by the Royal Agricultural and Horticultural Society to the winner of each section, and the prize presented by the Dried Fruits Board to the competitor scoring the highest aggregate points in all sections.

Group of Officials and Pruners, River Murray Pruning Championships, Waikerie, 1st July.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of June, 1937; also the average precipitation for June, and the average annual rainfall.

Station.	For June, 1937.	Av'ge. for June.	To end June, 1937.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	0·06	0·59	0·43	4·60
Marree	0·21	0·68	2·68	5·80
Farina	0·37	0·82	3·62	6·37
Copley	0·52	1·01	4·05	7·76
Beltana	0·72	1·03	4·96	8·39
Blinman	0·98	1·53	6·80	11·71
Hookina	0·81	1·64	6·39	10·94
Hawker	0·90	1·81	8·71	12·09
Wilson	1·08	1·71	7·64	11·65
Gordon	0·91	1·38	7·11	10·33
Quorn	1·05	1·74	9·05	13·10
Port Augusta	1·08	1·13	5·83	9·40
Bruce	1·05	1·27	8·15	9·74
Hammond	1·31	1·34	7·20	11·05
Wilmington	2·24	2·36	10·33	17·18
Willowie	1·25	1·56	7·07	12·10
Melrose	2·55	3·25	10·83	22·80
Booleroo Centre	1·55	2·09	8·28	15·14
Port Germein	1·40	1·49	6·94	12·51
Wirrabara	1·94	2·64	11·79	19·22
Appila	1·95	1·73	8·48	14·59
Cradock	1·24	1·49	7·45	10·67
Carrieton	1·64	1·60	6·74	12·11
Johnburg	1·35	1·27	8·40	10·49
Eurelia	1·34	1·62	7·28	12·66
Orroroo	1·29	1·72	8·04	13·12
Nackara	1·32	1·37	8·47	11·09
Black Rock	1·31	1·52	6·26	12·26
Oodlawirra	1·43	1·21	7·78	11·34
Peterborough	1·12	1·55	5·72	13·14
Yongala	1·32	1·78	7·70	14·37
North-East.				
Yunta	1·14	0·94	9·16	8·44
Waukaringa	0·50	0·99	7·45	7·82
Mannahill	1·19	0·87	8·13	8·08
Cockburn	2·42	0·90	7·13	7·81
Broken Hill	1·51	1·09	5·81	9·40
Lower North.				
Port Pirie	1·28	1·70	7·45	13·18
Port Broughton	1·59	1·97	8·68	13·87
Bute	2·70	2·21	8·30	15·42
Laura	1·72	2·36	8·01	17·93
Caltowie	1·80	2·01	7·84	16·69
Jamestown	1·87	2·25	8·95	17·68
Gladstone	1·61	2·02	7·28	16·31
Crystal Brook	1·84	2·10	8·70	15·79
Georgetown	1·62	2·39	7·36	18·24
Narridy	1·81	2·11	8·82	15·74
Red Hill	1·52	2·35	9·50	16·55
Spalding	1·45	2·44	7·73	18·68
Gulnare	1·85	2·44	8·58	18·51
Yacka	1·26	2·09	7·55	15·38
Koolunga	1·26	2·07	6·86	15·29
Snowtown	1·80	2·19	8·85	15·69
Lower North—*continued.*				
Brinkworth	1·63	2·21	8·60	15·72
Blyth	1·87	2·18	9·25	16·73
Clare	2·92	3·33	13·16	24·43
Mintaro	2·97	3·26	11·55	23·30
Watervale	3·57	3·69	13·86	26·69
Auburn	3·01	3·10	10·45	23·92
Hoyleton	2·59	2·21	8·72	17·25
Balaklava	3·10	1·88	10·17	15·41
Port Wakefield	2·17	1·60	8·16	12·93
Terowie	1·59	1·51	7·63	13·27
Whyte-Yarcowie	1·79	1·63	8·48	13·54
Hallett	1·55	2·09	9·07	16·39
Mount Bryan	1·56	2·21	8·94	16·76
Kooringa	1·78	2·35	9·02	17·78
Farrell's Flat	2·11	2·51	10·26	18·52
West of Murray Range.				
Manoora	2·19	2·42	8·55	18·91
Saddleworth	2·91	2·47	11·26	19·56
Marrabel	2·80	2·64	10·90	19·91
Riverton	3·15	2·71	11·23	20·79
Tarlee	2·62	2·28	8·36	18·06
Stockport	2·82	2·21	8·47	17·02
Hamley Bridge	2·61	2·21	7·96	16·52
Kapunda	2·06	2·44	7·89	19·74
Freeling	1·78	2·35	6·30	17·79
Greenock	1·97	2·83	7·90	21·47
Truro	2·64	2·65	7·99	19·75
Stockwell	2·09	2·73	7·47	20·02
Nuriootpa	2·47	2·88	9·11	20·74
Angaston	2·32	3·12	9·69	22·33
Tanunda	2·03	3·15	8·46	21·97
Lyndoch	1·65	3·48	8·54	23·28
Williamstown	2·04	4·55	11·09	27·54
Adelaide Plains.				
Owen	2·96	1·60	9·88	14·78
Mallala	2·11	2·25	6·62	16·43
Roseworthy	1·79	2·40	5·92	17·43
Gawler	2·12	2·56	7·71	18·85
Two Wells	2·32	2·28	6·34	15·80
Virginia	2·11	2·46	8·10	17·22
Smithfield	1·71	2·51	9·63	17·68
Salisbury	1·98	2·71	9·21	18·55
Adelaide	1·94	3·08	10·64	21·17
Glen Osmond	2·20	4·14	12·52	25·97
Magill	2·03	3·93	12·68	25·36
Mount Lofty Ranges.				
Teatree Gully	2·26	4·28	12·26	27·03
Stirling West	2·58	7·88	21·77	47·01
Uraidla	2·85	7·33	19·52	43·83
Clarendon	2·89	5·15	14·28	32·81
Happy Valley Res.	2·42	—	11·91	—
Morphett Vale	4·02	3·35	12·28	22·62
Noarlunga	2·79	3·11	10·14	20·35
Willunga	2·78	3·92	10·17	25·96
Aldinga	3·03	3·17	10·62	20·21

RAINFALL—*continued.*

Station.	For June, 1937.	Av'ge. for June.	To end June, 1937.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	3·51	4·69	13·50	29·72
Inman Valley	2·57	—	12·53	—
Yankalilla	2·97	3·74	11·05	22·78
Mount Compass	3·55	5·60	12·98	36·25
Mount Pleasant	1·64	4·17	9·81	27·08
Birdwood	1·74	4·59	11·07	29·02
Gumeracha	2·68	5·25	14·20	33·28
Millbrook Reservoir	2·77	5·08	15·91	34·50
Lobethal	1·94	6·00	16·25	35·94
Woodside	1·48	5·16	12 61	32·16
Hahndorf	1·52	5·51	13·13	34·82
Nairne	1·66	4·12	10·26	28·14
Mount Barker	1·63	4·47	11·39	31·24
Echunga	2·18	5·18	13·20	33·30
Macclesfield	1·97	4·38	10·18	30·37
Meadows	2·60	5·42	14·28	36·02
Strathalbyn	2·08	2·49	8 36	19·34
MURRAY FLATS AND VALLEY.				
Meningie	2·38	2·63	7·73	18·29
Milang	1·60	2·09	5·98	14·85
Langhorne's Creek	2·03	1·89	6·56	14·93
Wellington	1·55	1·89	6·82	14·66
Tailem Bend	1·78	1·77	6·88	15·07
Murray Bridge	1·31	1·63	4·53	13·49
Callington	1·31	1·93	5·22	15·14
Mannum	1·29	1·35	5·98	11·49
Palmer	1·45	1·91	7·56	15·63
Sedan	0·99	1·54	6·74	12·01
Swan Reach	1·57	1·19	5·28	10·62
Blanchetown	1·41	1·16	4·81	10·95
Eudunda	3·29	2·22	8·36	17·13
Point Pass	2·75	1·78	9·70	16·66
Sutherlands	2·50	1·33	8·97	10·71
Morgan	1·95	0·98	6·28	9·10
Waikerie	2·47	1·13	5·76	9·59
Overland Corner	1·99	1·10	4·89	10·18
Loxton	1·52	1·17	4·14	11·34
Berri	1·96	1·02	5·35	10·03
Renmark	2·00	1·09	6·17	10·33
WEST OF SPENCER'S GULF.				
Eucla	1·17	1·13	4·54	10·08
Nullarbor	1·13	1·34	2·94	8·87
Fowler's Bay	1·86	2·17	4·31	11·93
Penong	2·13	1·88	5·17	12·28
Koonibba	1·62	1·74	5·29	12·18
Denial Bay	1·38	1·73	4·49	11·33
Ceduna	1·61	1·52	3·70	10·32
Smoky Bay	1·32	1·76	4·53	10·50
Wirrulla	1·11	1·68	7·77	10·87
Streaky Bay	2·04	2·80	5·29	14·91
Chandada	1·93	1·68	5·09	12.66
Minnippa	1·83	2·12	5·79	13·97
Kyancutta	1·84	1·62	4·88	13·45
Talia	2·31	2·70	7·05	14·76
Port Elliston	2·07	3·20	7·19	16·53
Lock	1·87	2·40	6·54	16·44
Mount Hope	2·53	—	11·45	—
Yeelanna	1·58	2·48	7·54	16·11
Cummins	1·96	2·94	8·22	17·70
Port Lincoln	1·55	3·14	6·78	19·35
Tumby	1·97	1·86	5·23	14·29
Ungarra	1·76	2·34	7·36	16·94
Port Neil	1·20	1·70	4·00	13·16

Station.	For June, 1937.	Av'ge. for June.	To end June, 1937.	Av'ge. Annual Rain-fall.
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	1·85	1·56	5·47	12·82
Rudall	1·84	1·48	5·68	13·23
Cleve	2·42	1·92	6·09	14·96
Cowell	1·58	1·26	4·62	11·06
Miltalie	2·15	1·67	8·56	13·75
Mangalo	1·84	1·71	5·17	13·86
Darke's Peak	1·99	2·16	7·70	15·24
Kimba	1·11	1·45	4·71	11·84
YORKE PENINSULA.				
Wallaroo	2·05	2·04	7·27	13·97
Kadina	2·52	2·23	8·84	15·59
Moonta	1·04	2·17	7·34	15·04
Paskeville	2·43	2·28	7·37	15·44
Maitland	2·32	2·99	8·91	19·86
Ardrossan	2·44	2·00	8·00	13·96
Port Victoria	1·67	2·27	7·77	15·39
Curramulka	2·30	2·71	7·56	17·81
Minlaton	1·97	2·76	7·43	17·72
Port Vincent	1·98	2·25	5·67	14·37
Brentwood	2·19	2·32	8·69	15·61
Stansbury	2·28	2·47	6·92	16·81
Warooka	1·75	2·67	7·20	17·44
Yorketown	2·11	2·59	6·89	16·88
Edithburgh	1·94	2·36	6·28	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	3·99	4·57	13·43	24·87
Kingscote	2·98	2·99	8·45	19·27
Penneshaw	2·53	2·79	8·46	19·18
Victor Harbour	3·15	3·18	11·19	21·43
Port Elliot	2·38	2·81	9·47	19·94
Goolwa	2·68	2·43	9·29	17·84
Maggea	2·24	1·04	5·41	10·02
Copeville	2·26	1·36	5·89	11·51
Claypans	2·84	1·02	6·00	10·53
Meribah	1·04	1·12	3·78	11·11
Alawoona	1·20	1·17	5·02	10·26
Caliph	1·78	0·99	6·36	10·44
Mindarie	2·21	1·39	5·44	12·13
Sandalwood	2·03	1·66	5·77	13·60
Karoonda	1·92	1·65	5·86	14·18
Pinnaroo	1·29	1·60	4·17	14·19
Parilla	1·70	1·65	5·31	13·64
Lameroo	1·62	1·88	5·48	15·79
Parrakie	1·88	1·68	5·74	14·61
Geranium	1·96	1·90	6·73	16·39
Peake	1·73	1·86	7·31	15·95
Cooke's Plains	1·75	2·01	7·22	15·29
Coomandook	2·16	2·22	7·03	17·03
Coonalpyn	2·32	2·31	7·19	17·65
Tintinara	1·20	2·46	7·47	18·72
Keith	1·74	2·20	7·20	17·96
Bordertown	0·42	2·53	7·65	19·14
Wolseley	0·40	2·38	6·87	18·47
Frances	0·54	2·53	7·34	20·12
Naracoorte	0·50	3·21	8·86	22·65
Penola	0·44	3·51	9·06	25·94
Lucindale	1·28	3·47	11·89	23·47
Kingston	0·71	3·88	7·67	24·24
Robe	1·58	4·02	10·28	24·65
Beachport	0·92	4·63	9·70	27·07
Millicent	0·97	4·62	11·68	29·87
Kalangadoo	0·55	4·12	10·53	32·05
Mount Gambier	0·58	3·96	8·01	30·34

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East, 18th June, "Summer Fodder," W. L. Laslett and G. Thompson. Appila-Yarrowie, 4th June, Discussion, "Wheats of Years Ago." Balumbah, 2nd June, "Assistance to Farmers," A. J. Swann. Baroota, 10th May, "Pea Growing," F. McDougall. Blyth, 28th May, Papers, J. H. Hurst and C. D. McCrea; 17th June, "Wool Industry," C. A. Goddard. Booborowie, 7th June, Annual Meeting. Booleroo Centre, 29th May, Questions. Boor's Plains, 2nd June, "Value of Sheep," C. Rodda. Brimpton Lake, 10th June, "Sheep on a New Block," M. B. Dunstan. Brownlow, 26th May, Question Box. Brinkley, 24th May, "Seeding Operations," R. L. Griffiths. Cambrai, 5th May, "Wool Industry," C. A. Goddard; 14th June, "Cultivation," R. L. Griffiths. Coonalpyn, 9th June, Address, W. J. Spafford; 23rd June, Social. Dorset Vale, 19th June, Discussion, "Onion Growing." Eurelia, 22nd April, Social; 9th June, "Wool Production," C. A. Goddard. Glencoe, 1st June, "Handling Meadow Hay," I. Sims. Goode, 26th May, Address, C. P. Will. Green Patch, 20th May, "Pasture Establishment," P. Pope. Hilltown, 1st June, Social. Hope Forest, 3rd May, "Herd Testing," C. E. Verco. Ironbank, 26th May, Address, M. Vickers; 23rd June, "Codling Moth Control," M. Basey. Karte, 26th May, "Fencing," C. Gum; 23rd June, Annual Meeting. Kelly, 5th June, Annual Meeting. Keyneton, 9th June, "How We Shall Run Our Bureau," P. R. Evans; 21st June, "Wool Industry," C. A. Goddard. Kingston, 21st May, Addresses, C. A. Goddard and S. Shepherd. Koonunga, 23rd June, Discussion, "Pruning." Koppio, 19th May, Questions. Kyancutta, 1st June, "Feeding Sheep," K. H. McEwen. Lameroo, 28th May, Paper, A. J. A. Koch; 18th June, "Old Varieties of Wheat." Laura Bay, 11th May, Discussion. Light's Pass, 24th May, Debate, "Raising the School-going Age"; 21st June, Discussion, Pruning Competitions. Lobethal, 20th May, "Fruit Culture," H. Schapel. Maltee, 17th June, "The Bureau System," S. Morgan. McLaren Flat, 26th May, "Wool Industry," C. A. Goddard; 24th June, Address, F. B. Wilson. Milang, 19th May, "New Zealand Tour," R. C. Scott. Monarto South, 19th June, "Power Farming," C. F. Altmann. Morchard, 30th April, Discussion. Mount Barker, 21st June, Address, R. Hill. Mount Bryan, 22nd May, "Home Footpath Construction," T. P. Griffin; 21st June, Address, W. J. Spafford. Murraminga, 5th June, "Gardening," T. J. Battams. Murraytown, 8th May, Question Box; 5th June, "Seeding," E. L. Orchard. Mypolonga, 19th May, Address, W. J. Spafford. Myponga, 10th June, Annual Meeting. Nantawarra, 20th May, "The Evil of Continuous Cereal Cropping," O. Bowden. Narridy, 5th June, "Wheat Prices," Dr. A. R. Callaghan. Nunjikompita, 27th May, "Sheep Management," W. H. Brownrigg. Penola, 18th June, "The Breeding Ewe," W. A. Clifford. Penwortham, 16th June, "First Aid," Dr. Sangster. Pinkawillinie, 20th May, "Ailments of Horses," W. A. Moldenhauer. Pinnaroo, 18th June, Discussion, Early Wheat Varieties. Poochera, 1st June, "Farm Blacksmithing," F. Danenburg. Ramco, 24th May, "Tray Drying Gordos," F. Lewis; 23rd June, Address, E. Leishman. Redhill, 15th June, "Classing the Farm Clip," T. H. Torr. Robe, 18th June, "Clearing Ti-tree," E. W. Banks. Roberts and Verran, 26th May, "Farm Masonry," J. Pahl. Rosedale, 1st June, "Canary Seed," R. Hill; 22nd June, Discussion, Early Wheat Varieties. South Kilkerran, 7th June, "Fences and Gates," N. W. Bittner. Springton, 2nd June, Discussion, Wheat Varieties. Stockport, 14th May, Address, O. Bowden. Summerfield, 11th June, "Sheep as a Sideline," E. H. Paech. Sutherlands, 20th May, "Modern Farming Methods." E. L. Orchard; 10th June, "Pig Slaughtering," E. A. Schiller.

Tantanoola, 5th June, Paper, J. P. Burchard. Upper Wakefield, 24th June, Debate, Road *v.* Rail Transport. Wandearah; 25th May, Address, E. L. Orchard. Warcowie, 22nd May, "Seeding," W. J. Sanders; 8th June, Addresses, E. L. Orchard and C. A. Goddard. Warramboo, 1st April, Address, P. E. C. Daniel; 6th May, "Cement," E. B. Kane; 3rd June, "Sheep Management in the South-East," H. Chilman. Whitwarta, 7th June, Question Box. Willowie, May, Debate, "Mixed Farming *v.* Grazing." Williamstown, 24th June, "Wool Industry," C. A. Goddard. Wilmington, 8th June, "Orchard Management," J. B. Harris. Yadnarie, 25th May, "Cement on the Farm," J. R. Mackie. Yundi, 16th June, "Vegetable Garden," A. G. Edquist.

Papers Read at Conferences

Soil Treatment and its Effects on Citrus Growing

[L. A. CHAPPLE, Berri (Waikerie Conference).]

A few years ago at a Bureau Conference, the following resolution was passed:—"That before any new area be allotted for planting, a soil survey be made of the area." Most people agree that land previously allotted would mostly pass suitable for planting, and quite a large percentage of it as suitable for citrus growing, particularly the sandy slopes of the high lands. Nowhere in the world is the climate more suitable for growing oranges of high-class than the Murray Valley. Yet with suitable land, suitable climate and suitable water supply, one has to admit that many hundreds of trees planted never reach a profitable stage of growth, and many die completely. Surely this state of affairs is worthy of our earnest consideration.

Most citrus groves in the Murray Valley are well worked, well manured, well pruned and well supplied with humus by the growing of cover crops, all of which practices are not only fairly general, but fairly uniform. It seems that water is the one thing we do not know how to use.

Pruning, although a necessary practice, has nothing to do with the subject, "Soil Treatment," so on that account will be ruled out, but water can be joined with all other cultural practices. For water to be effective, the ground must be worked. The question is—How much? Mr. F. H. Metters, in his report on "The Citrus Industry of America," says:—

"Whereas cultivations were formerly deep and frequent, present-day practices are generally for light working, and as infrequently as possible. The periods between cultivations are governed to a large extent by weed growth, and the necessity of maintaining irrigation furrows in a serviceable condition. . . . This practice . . . is due in part . . . to the now generally accepted principle that the less frequent stirring of the surface soil is beneficial to tilth, root development and moisture penetration." There are still other good reasons for not stirring the ground too frequently. There is less danger of humus being burnt out of the ground by excessive heat waves, and there is less danger of "hard pan" forming.

When should manure be applied? Organic manures, such as farm-yard and bone manures, should be applied at ploughing time—say July. Quick acting manures need to be applied during the active growing period of the tree, or they are more or less wasted by rain or irrigation water. Supplying humus to the soil is a most dangerous practice—especially in growing peas and beans; and much of the high water-table trouble can be put down to the attempt to grow these plants. They require to be sown early in autumn, and to get them well established, they need too much water when the tree is not in active growth. It is pleasing to see rye being more generally grown for this purpose.

Irrigation.

As most orchards are watered by the furrow system, and under the community system of irrigation—neither of which are in the best interests of citrus growing—we must do the best we can with what we have at our disposal. Much of the trouble is caused by too much water, and a small percentage by too little water. Yet it is always the small percentage that calls the tune for the next irrigation, and usually that portion not requiring water is drowned out again. Most growers, through lack of experience, and to save expense in the first instance, put in too few channels, and this is one thing that needs attention, perhaps more than anything else, so that the dry portion of the block can be watered separately.

There is one thing necessary for the successful growth of any plant life, and that is air. Fill the ground up with water to the exclusion of air, and what is the value of other cultural practices? The activities of the tree are confined to a mere surface area, while many of the roots are rotted and the tree declines. No doubt, the best producing trees are those growing on soil that has free drainage. But as natural drainage, in most cases, eventually becomes choked, agricultural drainage must be resorted to. Mr. W. R. Schoonover, Citriculturist at the University of California, says:—"Tree health and high production are promoted by a drying-out of the soil between irrigations, and especially so in spring and early summer. When water is applied, it should be distributed so as to wet the entire root zone insofar as this is possible."

The experimental plots under his care which gave the highest yields, were those in which the moisture content was relatively low and the amount of plant food relatively high. Trees beyond half-way down the row to be watered need special attention, by cutting the water between the trees or around them, so that the top end of the row is not over-watered while waiting for the bottom to receive enough.

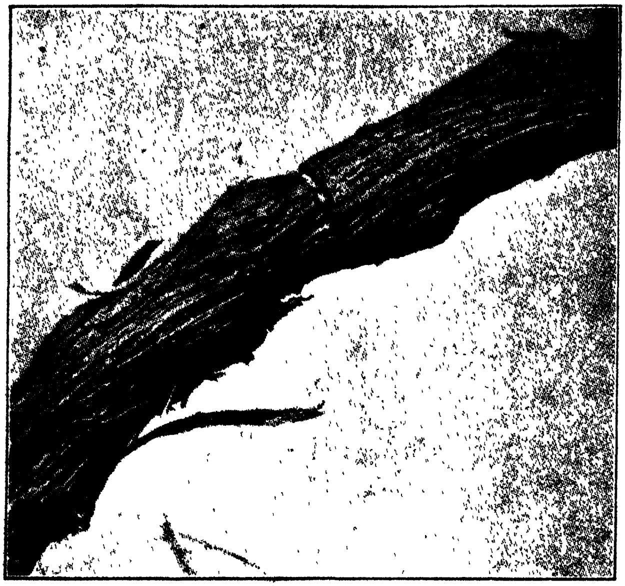
Any attempt to use the soil as a storage basin for future use is disastrous, as free water is always there to the detriment of the citrus tree. Mr. Schoonover says that no damage is done to a tree until it gets beyond the wilting stage. How often irrigation should be made depends on the class of ground the trees are growing on, but in all cases the watering should be finished as quickly as possible, with more frequent irrigations if necessary.

Cincturing the Currant

[C. G. Grasby, District Horticultural Adviser (Waikerie Conference).]

Historical.

Many of our fruit trees and vines and other plants have been introduced from Mediterranean countries, and a study of the conditions under which such plants were cultivated in the countries of their origin helps toward an understanding of how they should be treated in this State. It is directly due to the visit of the late Mr. W. C. Grasby, F.L.S., to Greece in 1896 as an Honorary Commissioner for the S.A. Government, that the practice of cincturing or girdling of the currant vine was first introduced into South Australia.



Vine stem, showing cincture.

An Old Practice.

The operation of cincturing fruit trees is very much older than the name by which it is designated. In the early part of the 18th century, monks hastened the fruiting of young pear trees by cutting away a piece of bark near the root of the tree. In the middle of the same century, gardeners in England brought young, rampant fruit trees into bearing by cutting a strip of bark from ½ inch to 1 inch wide (according to the size of the tree) nearly around the trunk at a convenient distance from the ground, leaving a portion of the bark on both sides of the tree as a bridge for the descending sap.

The Principle Involved.

Roots take from the soil moisture, and with moisture, small quantities of minerals. The total intake of water is large, but the amount of minerals simultaneously absorbed is not great; anyone may demonstrate this by burning a vine until nothing but white ashes remains. Of the total bulk of the vine, the white ash represents the minerals absorbed with water from the soil.

The water— with the mineral food held in solution—travels up the stem of the vine through the tubes of sapwood. There are many of these tubes, and a large quantity of water passes continuously up them. Anyone who has cut off a vine in spring and noted how it "bleeds" appreciates this upward movement of water and minerals. This sap consists largely of water with small quantities of plant food in solution. The loss of plant food is not great, which explains why the "bleeding" of a vine pruned late has no marked weakening influence on the vine. The water with its dissolved mineral passes up the stem of the vine along the arms, and ultimately to the leaves. Here, excess water is evaporated from the leaf surface. Whilst the leaves take in carbon dioxide from the air, and in the presence of sunlight, the green matter of the leaf assimulates carbon. The carbon so absorbed from the air is united with water and solutes from the roots, and elaborated sap is formed to provide for the growth of the plant.

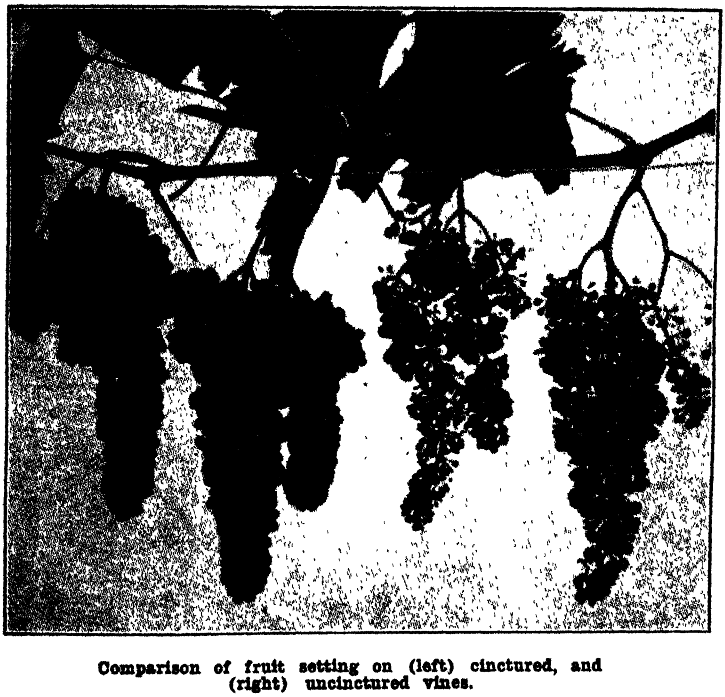
The next process is the distribution of sap to all parts of the plant. No growth can take place without this sap. The elaborated sap is carried to every part of the vine in the layer between bark and wood. In spring, the new shoots grow in length from the growing point, the material for growth being derived from the leaves, and in the early part of the season, from food materials stored in the vine over winter. The roots grow and can only grow by using the elaborated sap sent down to them from the foliage. That is to say, root growth is ultimately dependent on material supplied by the foliage. It will be readily understood that when a ring of bark is taken out around the stem of the vine, it does not interfere materially with the upward flow of water from the roots. However, it does check the downward flow of sap to the roots. The result is that elaborated food material is available for the development of growth and fruit, but not for the extension of the root system. The roots obtain fresh food materials by constantly sending out new rootlets and root hairs in fresh soil, and if the supply of sap is permanently cut off, they cannot do this, and the plant eventually starves. If, however, a slight girdle is made which will heal over in a few weeks, and re-establish channels for downward movement of sap, no permanent harm results. Healing can be accelerated by placing narrow strips of waxed cloth over the cinctures.

Why Cincture the Currant

Cincturing of currant vines is necessary in order to enable better setting of fruit. Almost everywhere except in very favourable seasons, the Zante Currant sets its fruit badly. Removal of a very slight ring of bark as the vine is approaching the end of its blossoming period, checks the downward movement of elaborated sap, throws an increased flow of sap into the branches and bunches during a critical period, and induces better setting. A narrow incision heals in the course of a few weeks to a couple of months, and then the functioning of the plant proceeds normally.

Effect of Wide Rings and Deep Cuttings.

Some growers make their incisions too wide, and the effect has been to produce big crops of bold berries of a reddish brown colour and poor quality. Often, little or no effect is noticed on vines at first, particularly if vigorous, but such excessive cincturing must weaken vines in the course of a few years. Sometimes the incision is made far too deeply, whereby the cambium layer is frequently removed, or in most instances, removed partly. This tendency to cut too deep is caused by faulty tools, and the tendency of the operator to apply too much pressure on one side of the vine or stem. Such treatment has a much greater detrimental effect in weakening the vine than does wide cutting, as it amounts to partial, and in some cases complete ringbarking. The use of a saw as a tool for cincturing causes considerable damage, and is directly responsible for permanent



Comparison of fruit setting on (left) cinctured, and (right) uncinctured vines.

injury to many vines. The practice of lifting the bark as the knife (single cut) is drawn around the vine, is not advised.

The Operation.

The stems of the vines should be prepared a week or so before cincturing commences. The operation in its simplest form is devised to temporarily check the downward flow of sap at a certain period. This is often done by passing a knife around the stem of the vine when the corollas are falling from the bunches, and this has been found effective in some cases Best results are obtained, however, by removing a narrow strip of bark about 1/16in. wide when 50 to 75 per cent. of the corollas have fallen. If the incissions are made so that the cuts slant towards one another, wedge-shaped, the piece of bark is removed without difficulty, and with a suitable tool this can be performed in one operation. A suitable tool can be made from an old pitting knife, by shortening the blade to within 1½in. of the handle, heating the steel in a blow lamp and moulding the cutting part into the required shape. Some instruments on the market make the incisions too wide, and growers are cautioned against the use of such unsuitable tools.

Covering Cinctures.

This phase of cincturing is seldom carried out, but should be looked upon as important, especially in dry districts. A protective covering over the cinctures helps the wound to "bridge over" rapidly, and more effectively. Suitable coverings, such as waxed cloth, waxed tape, electrical friction tape and even gummed paper (used for fastening parcels) have been utilised with advantage.

Judicious cincturing is a satisfactory means of inducing good setting of Zante Currants and profitable yields. A grower should study his vines and adapt his practice to suit local conditions. It should be borne in mind that the vigour of the vine, manurial treatment, soil, irrigation and other factors all have an influence on cropping. Vigorous vines should be given more work to do by leaving short rods; this will tend to increase yield, fine down the quality of the fruit and steady growth. Severe cincturing depreciates quality and damages the vine, but wise cincturing at the right times gives an increased yield of even berries of good quality and flavour. If growers cincture severely, big, brown, watery berries are sometimes the result, and this type of fruit is readily damaged by rain.

In conclusion, it is suggested that currant growers should personally supervise cincturing operations; frequently, the stem of the vine is damaged badly during preparation for cincturing.

Combating Damage from Spring Frosts

[By F. B. Harden, Secretary of the Committee (Waikerie Conference).]

Historical.

Owing to frequently recurring losses to growers from spring frosts in definitely defined areas of the Waikerie Irrigation Settlement, the Waikerie Branch of the Agricultural Bureau was requested to endeavour to organise an effective method of frost control. With this object in view, a meeting of growers was called on 8th July, 1935, at which frost combating methods were outlined by Mr. W. S. Nicholls, of the Shell Company, N. R. Quinn, of the Department of Agriculture, and F. R. Francis, grower, of Waikerie. The outcome of this meeting was the appointment of a Bureau Frost Committee, the members being Messrs. L. W. Andrew (Chairman), A. Hall, F. R. Francis, F. Mattner, C. B. Williams, J. Ohlmeyer, and F. B. Harden (Hon. Secretary). (This Committee has the distinction of being the first formed on the River Settlements for frost combating, and the Waikerie Branch of the Bureau of being the first organised body on the River to do anything of a practical nature to assist growers to minimise loss through spring frosts).

[From *Californian Citrograph.*

Heaters burning under full draft.

The first meeting of the Committee was held at the Soldiers' Memorial Hall on Friday, 12th July, 1935. At this meeting discussion took place as to the necessary plant and material and the cost therof, the installing of frost alarms at various points in the Settlement, the cost and the financing thereof. It was estimated (on figures obtained from Mr. J. B. Harris, Department of Agriculture) that each alarm would cost approximately £7 installed (in actual fact, they cost nearer £9 when completed).

The method of conveying the alarm signal to growers with a minimum of delay exercised the minds of the Committee, and a scheme submitted by Mr. G. E. Kerr, of Waikerie, was discussed and accepted as a basis, and a scheme was devised and resolved as follows:—

(1) That a community-owned electric frost alarm of a reliable nature should be installed in what is considered (and known to be) the frost pocket that would give the first indication of a dangerous frost.

(2) That the owner of this property shall, on the occasion of the frost alarm operating during the danger period (chiefly September-October) immediately notify the operator of the local exchange.

(3) Upon receipt of such notification, the operator shall ring those subscribers whose names would be submitted to the local Postmaster by the Bureau Frost Committee, and an agreed upon frost alarm signal should be given.

(4) That the subscribers who wish to be so warned shall agree to have the charge for the call debited against their 'phone account.

Following this Committee meeting a meeting of growers concerned in frost fighting was arranged for 26th July, 1935. This meeting was actually the first meeting held on the River dealing exclusively with frost matters. At this meeting the recommendations of the Committee were submitted and agreed to, the following resolution being carried:—"That the Committee proceed with the scheme as outlined, and that three alarms be installed on the Settlement". It was also resolved that the alarms be placed on the properties of Messrs. J. Ohlmeyer (south-east), F. R. Francis (south), and A. Hall (south-west).

It will be realised from the foregoing that although the Bureau Frost Committee had decided upon certain procedure, before it could be carried out it would be necessary to obtain the consent of the Postal Department to operate the alarm system through the local exchange. The question of finance arose. In regard to the Postal Department, we have been decidedly fortunate in having a Postmaster (Mr. R. Dale) in charge here who co-operated with us in a manner that, subsequent to consent being obtained from Adelaide, made the scheme easy to implement, his advice and assistance being such that only those of us directly connected with the work of installation, etc., can fully appreciate it.

Mr. R. Quinn (Department of Agriculture) also assisted. In reference to finance, our Chairman, Mr. L. W. Andrew, acted as financier, and was repaid when levies were collected. Although these gentlemen are briefly referred to here, it was their combined actions that made possible the immediate erection of the alarms in time for the 1935 spring frost period, and they are deserving of the appreciation of the growers in view thereof.

General Outline of Frost Alarms and Working of the System.

The principle of the alarm is that of a continuous circuit of electric current in operation through the mercury of the thermometer, placed in the frost pocket of the property, from 3 Midinger cells, each of 1½ volt capacity, placed in the grower's house and connected by wires to the thermometer. These wires being joined to a telegraph relay electric magnet switch, hold open a dry cell battery circuit, to which is connected an alarm bell. The wires from the Midinger cells are connected to the thermometer by means of platinum points inserted at the base of the thermometer and at 34 degrees F. Should the mercury fall below 34 degrees F. a break occurs in the Midinger circuit, and so through the withdrawal of the electric current the magnet no longer operates, allowing the relay switch to be pulled across by a spring to a point, and so make complete the dry cell circuit. This immediately sets the alarm bell (a particularly good one) ringing in the grower's bedroom, who, waking at once, notifies the exchange. The exchange operator has warned the 40 growers concerned in approximately 7 minutes after receipt of alarm. The procedure followed in the local exchange, when giving the warning, is to plug in a number of subscribers at a time, give a frost warning of the Morse D — . . The grower arises, simply gives his telephone handle a turn or two, causing his shutter at the exchange to fall, and the exchange operator, after ringing all members, checks off the fallen shutters and rings again to those whose shutters have not fallen, until they answer the 'phone; this ensures everyone being warned with a minimum of delay.

The thermometers used in the alarm are of a particularly high class, costing £3 3s., and are definitely reliable. The continuous circuit is considered the most reliable, as no matter where a break occurs, the bell will ring; for instance, a broken wire anywhere in the circuit rings the bell. The alarm itself can, and should be, tested every night simply by breaking the circuit by means of a switch; should the bell not ring when the circuit is broken, the fault would be sought at once. In order to obviate the danger of the night operator not awakening when rung, we have, through the courtesy of the Postal Department, and Mr. A. G. Cameron, M.H.R., an extension bell connected with the Postmaster's residence as an additional safeguard. It will be realised that unless the implementing of the alarm system is 100 per cent. perfect, the system becomes a menace instead of a safeguard, insofar that growers relying upon it, may be caught unawares and their crops ruined. There have been mistakes made and corrected, and we now consider we have here in Waikerie, a 100 per cent. alarm system which has definitely saved the growers many hundreds of pounds during the two years of its operation. The cost of the system to subscribers has been 17s. 6d. each, to date, plus costs of a telephone call (3d.) each warning. The rule we work under is that any new subscriber shall pay a 15s. initial fee, and that the alarms are the property of the Bureau, and may be shifted any time at the Bureau's wish, and are at all times in charge of the Bureau Frost Committee.

The installation of these alarms was a boon to those growers who in previous years had spent many sleepless nights watching the thermometer. In the spring of 1935 they were for the first time able to rest in the knowledge that should a dangerous frost be imminent, they would be warned in ample time to take the necessary precautions; and the 1935 season was the first one for many years that damage from spring frosts was definitely checked at Waikerie.

The September-October period of 1936 was a severe test of the reliability of the alarm system, and proved it to be definitely reliable. In that period there were eight frosts with minimum temperatures ranging from 26 degrees to 32 degrees, and in every instance, through timely warnings, growers were able to save their crop.

The foregoing is an outline of the organised centre of our first combating methods, but the actual fighting of the frost remains the task of the individual grower, and it is now proposed to deal with that branch of the work dealing with the methods adopted, and the deductions from results during the 1936 spring frost period.

From records kept by one of the growers (Mr. A. Hall), on whose property a Bureau alarm is installed, the following frosts are shown to have occurred:—

	Alarm Rang.	Minimum Temperature Recorded.
4th September	2.45 a.m.	29 degrees
16th September	1.20 a.m.	34 degrees
17th September	3.55 a.m.	31 degrees
20th September	3.40 a.m.	31 degrees
23rd September	1.15 a.m.	28 degrees
24th September	1.30 a.m.	26 degrees
26th September	1.30 a.m.	28 degrees
27th September	1.30 a.m.	28 degrees

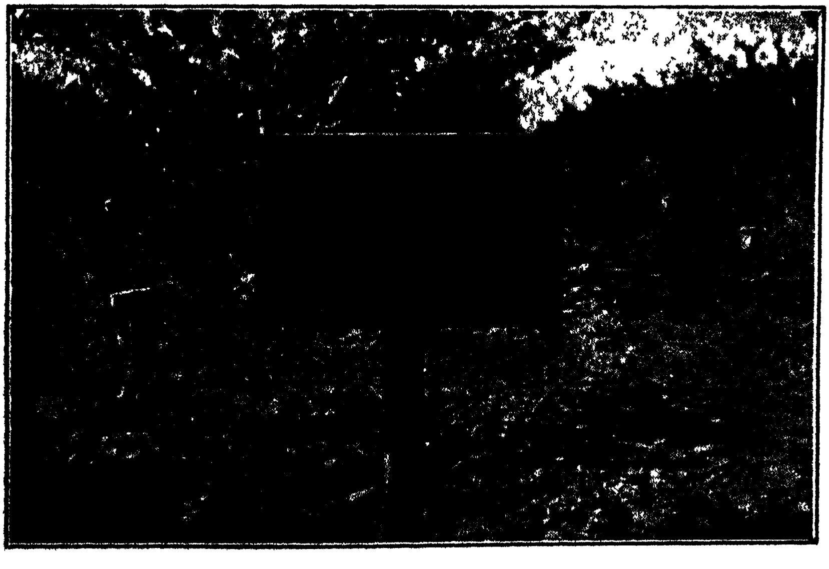
It will be seen from these records how severe the efforts of growers to combat frost were; yet so successful were they, that the areas protected by oil-burners stood out as vivid green patches against the blackened frost-bitten areas surrounding them.

Methods of Operation.

In preparing to combat frost, the grower places his oil-burners about the area to be protected in readiness for lighting; these burners contain approximately 1¼ galls. to height of damper, consuming 1 gall. every 2 hours without dampers. The lighter is also in readiness, pending the alarm signal. It is considered that 200 to 250 oil-burners are enough for one man to attend to; if more are used, it would be necessary to have assistance. A reserve of oil in drums is also on hand for re-filling, should the burning period be a lengthy one. The plant required per acre is as follows:—60 oil-burners, 120 galls. of oil, 3 40-gall. oil drums, a lighter.

Thermometers should be placed about in order that the fall of temperature may be noted, and burners used accordingly. A check thermometer or so placed outside of the protected area is necessary, otherwise unnecessary oil may be used or fires damped down too soon and the crop ruined. Once the initial outlay is made and care taken of the plant, it will last quite a number of years. Thermometers should be placed 2ft. 6in. above ground. The procedure usually followed is to light every alternate burner first with the dampers on (a gallon of oil will then last 4 to 4½ hours).

If the temperature is still falling, the other burners are lighted with dampers on; if still falling, dampers are removed and the fight is on in earnest. It is by the careful watching of thermometers that economy in oil can be achieved, such as the replacing



Minimum alcohol thermometer in shelter, and heaters in position in orchard.

of dampers when a safety degree of heat is reached and can be held by so doing. However, a grower would be ill-advised to risk a falling temperature to save a little oil; he would naturally judge the position by reading his check thermometer in comparison with those among the burners.

In order to obtain reliable information in regard to frost control, our Committee circularised growers concerned, and from the replies received the following recommendations are made for frost combating to be successful:—That not less than 50 (preferably 60) oil-burners be used per acre. That it is better to keep the temperature up than endeavour to raise it, i.e., to light the burners at not lower than 31deg. That it is possible to maintain a temperature of 6-7deg. above check thermometer. That though it is stated that vines will stand at least 1deg. of frost, it is advisable to maintain the temperature at 32deg. or over. That though soil conditions may minimise frost damage, it is inadvisable to rely upon same to hold the temperature above danger point. That damage to crops will occur if lighting of burners is delayed with temperature falling. That a dangerous period at all times is the time between dawn and sunrise and for period thereafter. That it is unwise to put out burners at sunrise if thermometers are still showing degrees of frost.

It is noticeable from replies received to our questionnaire, that wherever a grower allowed the temperature to fall to a low degree before lighting, or put out his burners too soon, a heavy loss of crop resulted, but wherever the burners were used to maintain a temperature instead of trying to raise it, excellent saves were made. This appears to be quite a definite result arising from the severe frost of 25th September, 1936, and should be borne in mind by all growers contemplating frost fighting here or elsewhere.

The question has arisen as to whether the expense of frost combating is warranted by the crop save, but the figures supplied by one grower show that it cost £16 2s. 8d. for oil to protect 5½ acres during this season when burners were used effectively on eight occasions, or approximately £2 18s. 8d. per acre; which expense, though high, was warranted by the save made, and in ordinary seasons (1936 was abnormal in regard to spring frosts) would by no means reach this figure.

The Agricultural Bureau Frost Committee is pleased at the result of their organising of frost combating methods on this settlement, and believe that the success attained here will be an encouragement to growers to endeavour to overcome the frost menace in other areas. "*Eternal vigilance is the price of safety*" in this as in other matters. The thermometers will tell you what to do. Watch them; don't just light the burners and go back to bed; temperatures may still fall and the crop be ruined even after others have rendered a service of warning.

I have a sense of gratification that the Bureau has been able to inaugurate this organisation during my period as Secretary, believing that this service to growers will remain as long as the settlement exists, and proves conclusively how valuable to the producer is the Bureau system, which enables growers to meet and overcome their mutual obstacles to success.

Frost Prevention

[F. R. Francis (Waikerie Conference.)]

Following on the results of practices carried out on various orchards in the Waikerie area, this paper is an endeavour to give an outline of what should be done to combat frost damage in the light of experience gained along the River, but principally in the Waikerie area.

Types of Frost.

It is generally recognised that there are two types of frost:—(1) the breeze or "drift" frost; (2) the "still" frost. In laying out the orchard with heaters, these two types of frost should be taken into consideration.

The method for combating drift frost, is to place a double row of heaters on the sides of the orchard from which the frosts drift. Let the smoke and heat drift across the orchard, but those who have tried this method consider that it will give protection only to the extent of two or possibly 3degs. F. However, this method has its advantages where the operator is working on his own, as it enables him to hold the temperature while he is lighting the other heaters. In combating "Still" frost, heaters should be spaced evenly over the area to be protected.

Thermometers and Heaters.

One thermometer per acre of area protected is sufficient, but more are desirable, especially when the plot is a small one. Mercury thermometers are best, and should be placed in a wooden shelter, which can be cheaply constructed out of two boards. These shelters should be nailed to a firmly-set post and be at 3ft. from the ground or at vine level

A check thermometer should be placed approximately two chains away from the heated area and away from all heater influence. This thermometer enables the operator to know what the outside temperature is, and so will prove a guide to the time to put out the heaters.

The generally accepted method of lighting heaters is to use a torch which contains a 50-50 mixture of petrol and kerosene, and which is constructed on the principle of a miner's safety lamp. When the temperature falls below 32degs. F., or freezing point, light every alternate row of heaters; then watch the thermometers. If the temperature is still falling, light the remaining heaters. If this does not prove effective, remove the spreaders. It has been proved that 60 heaters per acre with spreaders removed will combat a frost of 6degs. The use of more heaters than is required to hold the temperature at 32degs. is only a waste of money, and that is where accurate thermometers mean money well spent.

The following is a list of temperatures at which different varieties of fruits should be protected:—

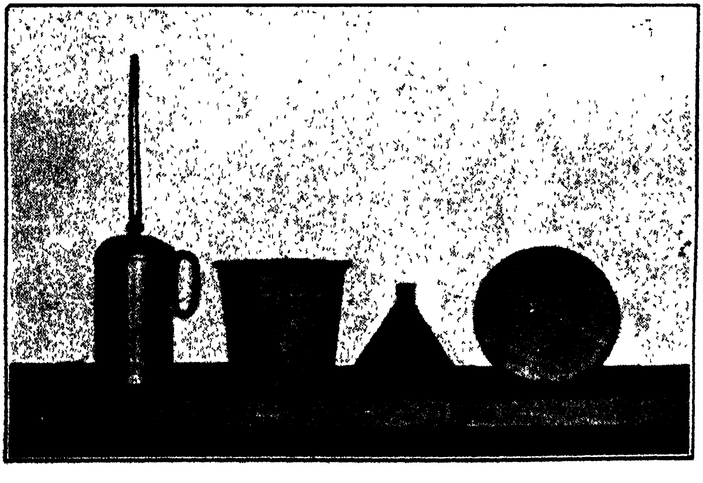
Apricots, 32deg. F., 3 feet from ground.
Sultanas, 31deg., F., at vine level.
Currants, 30deg. F., at vine level.
Gordos, 30deg. F., at vine level.

In the very early stages of bud burst these varieties under some conditions might stand a lower temperature, but when well developed and/or in the setting stage, no risks should be taken whatever.

Aids to Frost Prevention.

It has been found to be a help if all timber is removed from boundaries to allow a free current of air. Any break, such as timber or high banks, should be removed, as they hold up a frost. All cover crops should be disced down, the ground should not be cultivated after the end of August, and kept in a moist condition. There is definite proof that where the soil has been even lightly cultivated, the temperature above that soil will be 2deg. lower than above uncultivated ground.

Frost prevention on a block which is subject to late spring frosts, is an economical proposition. As a rule, growers do not have more than two or three light frosts of from 3 to 4 deg., except in an exceptional year, such as 1936 and 1927.



Lighting torch and burning pail with flame spreader and lid.

Insurance Cover against Climatic Damage

[F. B. HARDEN (Waikerie Conference).]

In view of the wide field of risks covered by insurance in general trade ventures, it has appeared to me to be not an unreasonable risk, for insurance companies or a Government Insurance Department to undertake an insurance cover for primary producers against out-of-pocket losses when crops are depleted or destroyed by a climatic visitation.

When it is realised that the whole structure of manufacture, trade and commerce is based wholly on insurance against loss and that without that insurance foundation they could not exist, one must wonder why the primary producer is not included in the sphere of risks covered; particularly when we know how dependent our State is upon primary production. The answer may be that the primary producer is so much at the mercy of the elements. That may be so, but is not all insurance against the elements? Take for instance the ship at sea laden with tons of valuable cargo and herself of immense value; is she not at the mercy of the elements—fire, storm and shipwreck. But she is completely covered by insurance, and her cargo as well. Take also the factory, workshop or store, both big and small, and there again there is a complete insurance against fire, however caused, outside the control of the owners.

Life is covered by insurance with the sure and certain knowledge that some unspecified day a claim will be made against the policy and will be met; and the basis of life insurance, after all, is just that of a pooling of funds so that when needed by the individual, the money is available from the many. But if every policy holder desired help at the same moment, it would perhaps not be possible to finance; but as we know, that position will never eventuate, and so with insurance against climatic losses every producer will not require assistance at the one time, but only a section here and there. With all producers contributing, a fund of the necessary proportions would soon be acquired.

Dried fruit, wheat, butter, etc., can all be covered by insurance once they are harvested, and placed on the market and no longer in the producers' hands, but prior to that, the loss from any cause must be borne by the grower. There is no insurance cover for him; why?—is it because the risk is too great and the premium too high in consequence? or is it because the position has not been examined closely enough by men whose minds are capable of finding a suitable basis for such a class of insurance. I favour the latter view.

Now, if we take our industry of dried fruit production and consider what an insurance cover against out-of-pocket expenses would mean, it would be realised how vital to our chances of success such cover would be. If one considers the annual cost of an acre of vines (not including labour) carrying a mortgage of £100 at interest of at least 6 per cent., with water rates £3, manure £2 10s., council rates and land tax £1 (these figures are conservative) producing an average of 1 ton to the acre —over a period of years—of 3 Crown sultanas at a nett return of £31 in the sweat, and consider for a moment the serious import of these figures when the crop is lost through unseasonable climatic conditions. These figures total £12 10s. or 40 per cent. of nett returns.

When you have experienced loss in this way, have you ever had your interest, water rates, etc., rescinded? Of course not; so in the event of loss, these charges accumulate against the succeeding years, and together with the subsequent years' charges, represent, with compound interest, 80 per cent. of nett returns. These figures are not mythical, but hard facts, if you care to face them.

From a sense of fairness and equity, financial institutions and governmental bodies should be prepared to stand a share of the loss from climatic damage with the grower, when that loss is caused by a natural visitation of a proved nature, to the extent of drawing the pen through that year's annual charges; after all, the benefits of a good season are mutual, why not the losses of a bad season?

There is no reason why a State-wide insurance fund could not be created by acreage levy or land tax, to be used definitely for the purpose of reimbursing the grower for out-of-pocket expenses when his crop is a total loss; exactly what the tax should be could be ascertained from figures available to a Government Statistician.

It should be possible to classify lands for payment of definite amounts against loss, wheat per acre, vines per acre and so on; payments that could be fixed in detail were a scheme of a comprehensive nature inaugurated.

It will be realised that a loss from climatic causes is rarely State-wide, only visiting portions of the agricultural areas spasmodically, and through a properly drawn up scheme, a producer could apply for an agreed upon reimbursement of his monetary outlay, to produce the crop that has been destroyed.

Insurance cover accident generally has a clearly definied value of various limbs and organs of the human body, based presumably, on the use of any particular limb, eye, or finger, and so it should be quite possible to place reimbursement value on various lands against loss of crop.

National Insurance against unemployment is the accepted policy in some countries, and as unemployment is definitely the outcome of our present man-made social and financial system, it is not even based on the elements of chance, but follows inevitably the boon and slump cycle, proving conclusively that insurance cover can be had against the inevitable, and is considered good business; therefore, insurance against climatic loss to growers should be within the realm of possibility.

Under present conditions, there is an inverse system of insurance, insofar that attempts are made by Governments to assist primary producers to carry on production after some serious climatic loss by means of loans, advances or deferring payment of due, repayable with additional interest from subsequent crops, with all the attendant worry to the producer of working off a dead loss, and so be a drag on his energy and enterprise. Therefore, it would be more sensible to be able to pay an insurance premium over the years against such loss and so be able to draw on a fund for reimbursement with the knowledge that the loss has been definitely cut, and so does not interfere with his subsequent finances.

There seems to be quite reasonable grounds for the formulating of a Government Department of Insurance to handle this and other compulsory insurance projects. It is not for a moment suggested to institute insurance cover against damage caused by attempting to grow produce under definitely known adverse conditions for that particular produce, but that it is possible to formulate some fair and equitable insurance cover for primary producers, and so relieve them of the necessity of going cap in hand to the Government of the day for assistance, and it is time that producers ceased to be mendicants whenever the heavens interfere with the success of their crops, and one of the steps towards that complete independence of anything that savours of mendicancy would be State-wide insurance system that should not be outside the power of statesmenlike legislators to inaugurate.

Factors Affecting the Baume Content of Grapes

[By W. ERICK MEIER, Ph.D., Renmark (Waikerie Conference).]

The aim in primary production of any kind is to produce an article which satisfies the consumers' demands. With fruit, taste is the essential characteristic of quality, and this is determined almost entirely by the sugar content. Even though the quality of dried fruit is determined largely by colour, body—dependent almost entirely on sugar content—is an essential in all higher grades of fruit. For wine-making and distilling purposes, the sugar content of grapes is the only test of quality, and therefore the sole revenue determining factor. All efforts, therefore, must be mobilised to raise the Baume to its highest possible level.

It is a mistake to suppose that quality can be obtained by emphasising only one of the various factors concerned in the production of good fruit. It is a sound practice to consider a plant in the same light as an animal, or perhaps better—as a human being. A plant performs functions which correspond broadly to those in animal life. If, in addition to the mere maintenance of life, higher production (or extra work in animals) is required, an additional amount of energy in the form of food (or mineral salts) must be supplied; and just as there is a limit to the amount of work an animal can perform, so there is a limit to the producing capacity of a plant. When, through the concurrence of several favourable circumstances, the yield is abnormally good in any one year, a certain amount of energy will be spent in the following year rebuilding worn-out tissues, etc., with the corresponding reduction in crop. Such fluctuations may be counteracted to a great extent by adequate manuring, cultivation, etc., but the factors over which we have as good as no control, climate and soil, remain to affect our yields from year to year.

To obtain the highest possible yields of good quality during the lifetime of a vine, etc., every factor influencing growth must be considered. It is proposed to deal with these factors individually, even though it is their collective influence which produces the ultimate effect. A deficiency in any one of them will cause a decrease in yield corresponding to the amount of the deficiency, nor will an excess of any other factor make good this deficiency. This fundamental law (Law of Minimum) applies to Baume in fruit as it does to all agricultural production, so that the greatest efficiency must be obtained in all factors affecting growth. The chief factors are:—1. Climate. 2. Soil. 3. Cultivation. 4. Irrigation and Drainage. 5. Pruning, etc. 6. Manuring.

CLIMATE, SOIL, AND CULTIVATION.

Climate is one of the factors over which we have no control, but it is necessary to know the possible effects, so that variations due to it are not attributed to other causes.

As sugar is built up from the carbon dioxide of the atmosphere only in the presence of light, and at a comparatively high temperature, highest yields will be obtained with uniformly warm to hot and fairly dry weather, while the fruit is forming and ripening. Cool weather during this time, on the other hand, will lead to lower sugar content and a higher degree of acidity. Length of day appears to exert a marked influence, and in parts of Europe it is possible to produce wine grapes only because of the very long days in summer.

Soil is another factor over which we have a very limited control. Whereas fruit trees are restricted to more definite types of soil, vines do satisfactorily on practically all types, but show a preference for loams and clays, if well drained.

Very broadly speaking, there are three groups of soils; those of a sandy nature, those consisting of an admixture of sand and clay in varying proportions, *i.e.*, loam types, and those containing a preponderance of clay. Of these a sand is usually the poorest in regard to nutrients and humus, but usually possesses an excellent physical structure which allows for good aeration and drainage; while clay, comparatively rich in readily available—as well as less readily available—nutrients, possesse a very poor mechanical structure, and must be improved by the addition of humus and lime. The loamy soils take an intermediate position, and approach more the ideal type of soil.

Although sands and clays are so fundamentally different, the treatment meted out to them is largely similar. Both sands and clays respond well to liberal applications of organic matter, as well as phosphates and nitrogen, while potash does not appear to be so necessary in clay soils. Lime, again, need not be applied so heavily to most sandy soils, whereas clays must receive comparatively heavy dressings at frequent intervals, both as a soil nutrient and as a corrective. That clays require very much more assiduous working than sands or loams is, of course, common knowledge.

Nobody questions the necessity of good cultivation, but it is very doubtful whether sufficient is being done in this respect. To ensure uniformity in growth throughout the season, the soil must be well aerated and a good deep mulch maintained to counteract evaporation, and also to prevent the feeding roots from approaching too near the surface. But mere cultivation does not appear to be all that is necessary in this respect. One of the most important factors in the preparation and maintenance of good tilth (tilth is a term covering the state of a soil with respect to its physical condition, chemical condition and the state of its microfauna) is shade. Experiments conducted in Germany have shown that a covering of only about 1/5th inch of straw over the soil has resulted in an appreciable crop increase, while thicker dressings have influenced the yield considerably. The recommendations of late that cover crops should be cut up and allowed to lie on the surface, are undoubtedly a result of the shading effect.

In addition, the effects of salt may be counteracted by regular and well-timed cultivations, inasmuch as the concentration of salt near the surface where most roots are to be found is prevented. Time of cultivation plays a very important part in this respect, as it is necessary to stir the surface thoroughly, immediately after an irrigation or heavy rain, to keep to a minimum the upward movement of water.

Irrigation and Drainage.

As yet, comparatively little work has been done on irrigation under local conditions, and as a natural consequence, any ills occurring on the block are rarely associated with incorrect irrigation practices. Many of the fruit districts are fortunate in having a satisfactory natural drainage, but where the subsoil is more or less impervious, ill effects due to over-irrigating quickly become apparent.

From observations, one has no hesitation in saying that growers believing that they are treating the plant well, apply an excess of several acre inches at each irrigation. Applying this excessive amount to a plant, *i.e.*, to its roots, which constitute its "mouth", as it were, is roughly equivalent to taking an animal and pushing its head under water for some time, in the hope that it will drink sufficient water in that way. Both plant and animal can withstand such conditions for a limited time only, and must always be weakened thereby. In order to make this point quite clear, let us recall the elementary essentials of a fertile soil. They are:—Mineral matter—earth, etc.; Organic matter—derived from substances that have once been alive; Air—essential to healthy root development; Water—found in the finer soil spaces, with air in the larger (a condition produced by good cultivation); and Bacteria—which in feeding on organic matter, render it available to the plant.

The first effect of an excessive application of water, therefore, will be to drive air from the soil, then to drown the useful soil organisms, thus preventing the full and proper breaking down of the organic matter, and also to destroy soil structure, which has been built up with much hard labour and monetary outlay. In addition, there is a strong leaching of soil nutrients. Admittedly, there are difficulties to be overcome. Probably the drawback of the present system of irrigation is the fact that there are so few irrigations. In midsummer, water is applied liberally and very suddenly, after there has been a low percentage present in the soil. As a result, the vine literally shoots into renewed growth, which is of a very sappy nature. The effect of the two summer irrigations is further accentuated by the fact that the bulk of nitrogen obtained from a cover crop turned in just before spring, becomes available to the plant at this time. Thus there is a concurrent two-fold evil which forces the vine into renewed growth when under normal conditions, the main growth period, except for fruit growth, is practically complete. The reason that very heavy waterings do produce positive results, is due to the fact that, with a limited amount of nutrient in the soil, a greater amount of water is required to take up what available substance there is.

The ideal irrigation conditions would be a continuous, steady supply of water, but as the cost of this is at present prohibitive, every effort should be made to, so far as practicable, apply the axiom: less water at shorter intervals, followed by vigorous cultivation immediately after the irrigation and during the intervals. An excess of water has been repeatedly shown to lower sugar content and reduce keeping quality.

Intimately linked with the question of irrigation is that of drainage. A fundamental law here is *no irrigation without drainage*. When it is considered that the vine is a deep-rooting plant, under good conditions sending its roots down at least 5ft., it will be appreciated that a water table at from 1ft. to 3ft. must restrict the root growth to the area above the free water, and as the surface soil obviously dries out first, the plant must suffer when left without water for some time during very hot weather, despite good cultivation. But the effect of drainage is not limited to the discharge of surplus water alone. A very marked and useful effect is the aeration of the soil, due to what might be termed its sucking action. Conclusive proof of this, in addition to experiments carried out, is the choking of pipes with roots. In this respect it might be mentioned that experiments are in hand whereby drainage pipe chokes by roots may be eliminated. With the present impracticability of drain pipes, extreme care in the application of water cannot be overemphasized.

Pruning and Manuring.

Owing to the vigorous nature of the vines under local conditions, good crops are still obtained with comparatively rough pruning. This, however, results in an accumulation of old, dead wood on the vine, and a corresponding weakening, due to restriction of the sap flow, and dry rot, etc. For maximum yields, clean and careful pruning is essential.

Experiments conducted by the C.S. & I.R. on the sultana, show that medium-sized wood is the best fruit producer, while the production of fruit buds and the subsequent vigour of a fruiting rod depends largely on the accumulation of starch. Too many canes produce more fruit of a lower quality. Careful selection of the fruiting wood is therefore of primary importance. Further experiments have shown that with well-balanced pruning, disbudding becomes unnecessary, *i.e.,* practically no shoots appear.

With regard to cincturing, it was shown that very early cincturing increased yield, but decreased Baume, while late cincturing had the reverse effect. In addition to *clean* pruning and careful selection of fruiting wood, therefore, balance in formation is a leading factor in the production of quality fruit.

Manuring, after all is the most vital one concerning the grower, as without proper nutrition, all other efforts can have only a limited effect. To appreciate plant nutrition more fully, it will be well to consider those plant foods usually lacking to a greater or lesser degree in the soil, and the effects of their presence or absence in sufficient quantities.

Nitrogen.—Nitrogen is concerned with the building up of all plant tissues, particularly the proteins (body builders). Its effect is particularly noticeable on growing points, leaves, flowers and fruit. Large increases in crop can be obtained by heavy applications, but always at the expense of quality. An excess of nitrogen, particularly in summer, leads to the production of leaf buds and wood-shoots at the expense of fruit buds and shoots, increases the growing period, delays maturity, decreases disease resistance, and produces soft and immature wood. It is easily washed out of the soil. A plant well supplied with nitrogen possesses deeply coloured leaves and flowers, while a nitrogen deficiency becomes apparent by the undersized leaves and flowers and sickly colour. Nitrogen is usually supplied as organic matter, nitrate of soda, sulphate of ammonia and synthetic urea.

Phosphorus.—In general, phosphorus may be taken as having the reverse effects of nitrogen. It is directly concerned with the production, movement and deposition of proteins, and is an important constituent of cell nuclei. It encourages setting of flowers and formation of fruit, and hastens the ripening of the latter, as well as encouraging vigorous root growth. It is firmly held by the soil. A deficiency is noted by a very dark-green colouring of the leaves, which do not turn yellow before dying, but dry out brown, while flowers and fruit are poorly developed and may fall prematurely. Phosphorus is supplied, in conjunction with lime, as superphosphate.

Potassium.—Potash in many respects has a similar effect to that of phosphate. Potash is absolutely essential for the production of sugar and starch, without the potash itself becoming part of the substance. Potash is for starch and sugar production (the carbohydrates) what phosphorus is for the production of proteins. All plants containing larger amounts of starch and sugar are strong consumers of potash. It has a definitely stimulating effect on a plant, in addition to its effect on starch and sugar production, but like nitrogen, is not firmly held by sandy soils, but firmly held by clays.

Excessive supplies of nitrogen may be counteracted by potash. It increases the keeping quality of plants as well as their resistance to frost and rot. Furthermore, it reduces the length of the growing period and encourages earlier maturity.

A deficiency causes leaves to become discoloured, often with characteristic yellow or brown spots and leaden colourations and signs of scorching, owing to insufficient movement of plant food. Potash is usually supplied as sulphate of potash and occasionally as muriate of potash.

Calcium Lime.—Lime is very important, both as a plant food and as a soil improver. As a plant food it encourages vigorous and healthy growth by aiding the movement of starch and cellulose. It also encourages the formation of flowers and seed and prevents the toxic effect of organic acids by neutralising them. An excess restricts the uptake of potash. A deficiency causes the dying of the plant from the top downwards. It is fairly strongly held by the soil. Its effects on the soil may be enumerated as follows:—

1. Chemical—binds free acids and decomposes harmful constituents of the soil.
2. Physical—loosens and mellows down clays.
3. Bacteriological—encourages bacterial activity in the soil, and thereby ammonia and nitrate formation.

Lime is applied preferably as gypsum, but with care, in reasonable quantities; may also be supplied as slaked lime. In addition to these, such elements as magnesium, iron and sulphur are essential, but usually present in sufficient quantities. Experiments on vines with a salt of magnesium would warrant trial, as it is an essential constituent of chlorophyll, the green colouring matter of plants, which is essential for the formation of starch and sugar.

Of all the nutrients, nitrogen is the most important, the most expensive to buy, and incidentally, in many cases, the one that is being supplied in greatest excess. Nitrogen is needed when the plant is making its strongest growth, with vines and fruit trees from bud burst to approximately the end of October. Larger amounts of nitrogen after this time lengthen the growing period, naturally at the expense of other parts, *viz.*, fruit. In most blocks, a green manure crop is ploughed under during winter, and a dressing of nitrogenous manure given in early spring. (It must be pointed out here that plants are capable of taking up nitrogen as mineral salts as well as in an organic, *i.e.*, carbon compounds. The nitrogen taken in by the plant is reduced to a minimum by about the end of October, but that becoming available from the cover crop gradually increases in amount right up to December. But at this time we are having very warm weather, during which carbon assimilation can proceed vigorously, and so produce sugar. Nitrogen from the organic matter upsets this process, which is further detrimentally affected by the two summer irrigations, as these of themselves force the plant into vigorous and sappy growth. We are wasting therefore the greater percentage of the cover crop as a nitrogen supplier (of course, not as a soil improver). As all Australian soils are naturally lacking in phosphorus, heavy applications are essential.

With regard to potash, there is still a great deal of work to be done. Most of our soils appear to have a sufficiency. Speaking generally, sands contain little and clays a great deal. From personal observations in the production of beet sugar, however, an application of potash is necessary on all soils where intensive agriculture is carried on. Professor Richardson says that it is of definite benefit, even if only indirectly. Experiments by Vinet in France show definite increases in Baume, particularly with potassium sulphate supplied in winter, while Mr. Hardwicke of Berri, on a sandy loam obtained increased Baume's with December applications of potash. It would appear, therefore, that definite results should be obtainable in sandier soils and in clay soils that have been under intensive cultivation for some time. The time of application appears to be an important factor, as the percentage of starch in the cane is essential for fruiting, and potash determines the formation and deposition of starch.

On lime there is not a great deal to be said. All heavy soils need it, salty soils may be rectified by applying upwards of 10 to 12cwts. per acre, and it should be present at the turning in of organic matter. On the other hand, an excess may lead to the leaching of soil nutrients. Its importance beyond a limit for fruit trees lies more in its physical effects than as a soil nutrient.

Conclusions.

Baume, while it can possibly be influenced by one-sided measures, is a factor determined by the sum total of all factors controlling plant growth. Over soil and climate we have practically no control, but the remaining factors can be influenced largely by individual efforts. In cultivation nothing should be left to chance, especially after an irrigation in hot weather. Pruning should be done with due regard to each individual vine. The amount of water applied must be limited, and in this respect it would be wise to institute some means whereby blockers can measure the amount of water being applied to a block. Short and quick irrigations, especially in summer, on all but the heaviest soils, followed immediately by a thorough cultivation, will be well repaid. The water table should be lowered as far as possible to allow good natural root development, as healthy foliage is entirely dependent on a strong root system. In manuring, a balanced supply must be sought. As regards nitrogen, I strongly advocate the growing of summer crops, *e.g.*, sunflowers or pearl millet, sown about mid February and turned under not later than May, when still succulent. In this way the nitrogen bill may be lowered considerably, and possibly be eliminated eventually. Potash should be used carefully, but definitely used for some years, being applied at a time between December and early February. Phosphates must take pride of place, and should be applied liberally, to commence with anything varying from 4-6cwt. or even more. All, with the exception of nitrogenous manures, should all be ploughed in as deeply as possible.

Finally, then, Baume is raised to its maximum by vigorous working of the block, careful and balanced pruning, rapid and lighter irrigations at more frequent intervals, good drainage and shading of the soil, and a comprehensive, but carefully balanced manuring practice, with organic matter, lime and phosphate, the basis.

Deep Sump and Bore Drainage

[L. W. ANDREWS (Waikerie Conference).]

In order to introduce the subject of "Deep Sump and Bore Drainage" as carried out in this settlement, an endeavour has been made to obtain information from growers who have had practical experience with both the old type sump of about 8ft. depth and also the most modern methods of constructing a sump about 20ft. deep. The first on the list is the information supplied by Mr. A. E. Stephens, and is as follows:—

Report on Drainage System on A. E. Stephens' Block 80E, Waikerie.

In 1928 when I first took possession of the above block, it was rather badly affected with seepage. There was a bore and drainage sump, but it was draining only a small trickle of water. Investigation proved that there was only a short pipeline of about 100ft. with a short spur at right angles draining to the well. Tests with the post-hole auger proved dead water at various depths, ranging from 2ft. 6in. to about 5ft. over an area of six or seven acres, which appeared to be rather badly affected; indeed, one patch of about 2 acres of citrus was almost dead. In an endeavour to effect a cure of the trouble, I have extended the pipe-lines in every direction from the bore until there is over 3,000ft. of piping, which certainly seemed to drain a big stream; in fact, the stream is equal to that from a 2in. outlet pipe. The pipes are all laid on 3in. x 1in. jarrah and covered with 18in. of limestone. This system has proved most satisfactory and has drained most of the block very well. In fact, the two acres of oranges referred to have recovered, and now equal the best in the block. On the other hand, there is still one section that the pipes do not seem to drain very well at all, being too shallow to do any good, as they are above the level of good drainage ground. This patch has become worse, in spite of the money and labour spent. In an endeavour to also drain this portion I have deepened the drainage well to about 20ft. It was desired to go down to at least 25ft., but have at the present depth met with a flow of water rising from a still greater depth, which makes it impracticable to go further. Had this well been put down to this depth at the start, the whole of the area affected would have been drained in a much less time, more effectively, and at probably one-tenth the cost.

In increasing the depth of well we went through limestone rubble until we found bottom with a thin layer of blue clay, through which the present water supply is coming—through a hole pierced with a crow-bar at first, but now of course much larger. I can now reasonably hope that all my seepage troubles should now be nearly over, and incidentally that my neighbours will also benefit a great deal at my expense.

Work on Mr. J. S. Knight's Block.

Mr. J. S. Knight is another grower who has had considerable experience, even to the extent of putting down five bores on his property. The first was put down in 1930 by the Government, a sump 6ft. deep, with the bore cased to a depth of 180ft., which was a failure. They blew this bore at 80ft. with quite good results, but owing to the shallow depth of the sump, it would not draw water. The second bore was put down in 1932 with a sump 12ft. 6in. deep, bored to a depth of 120ft., cased to 90ft. from bottom of sump, and it has drained approximately seven to eight chains and has proved very effective.

The next bore was to a depth of 246ft. and cased to a depth of 130ft., but good results were only obtained after it had been blown at a depth of 76ft., and is draining water between seven and eight chains. Number 5 bore was put down in 1935, wth a sump 19ft. deep, drainage at 110ft., cased to 76ft., and draining up to four or five chains.

In limestone country bores are more economical than drains. The different strata of soil reached in all bores were of a similar nature, from 3 to 4ft. surface soil, 3 to 5ft. flint rock, 3ft. of blue clay, 2ft. of white clay, and stone again for 3 or 4ft. Test holes put down recently four chains away from the bore showed comparatively dry soil at 8ft., where four years ago water was from 12 to 18in. from the surface. It seems as though the best getaway in this locality is from 70 to 90ft.

One can relate similar instances over various parts of the Settlement. In my case, a bore put down with a 19ft. sump, surrounded by inspection pipes varying from 6 to 9ft. in depth, showed that 2½ years ago the water table was within 2ft. of the surface; to-day the nearest to the surface is approximately 6ft. 6in., and that is a distance of five chains from the bore, and the majority of the inspection pipes are dry. The result to date in both the oranges and sultanas is most outstanding.

The question is often asked what is the cost of a deep sump and bore? The average depth of that to which we refer as a deep sump in this district would be approximatey 20ft. and the bore another 100ft. The cost of these vary according to the nature of soil and the methods adopted in sinking, but according to figures supplied by various growers the average cost is in the vicinity of £60. The cement rings in place of the timber, which was orignally used, seem to be more favoured at present.

Mr. J. L. Smith's Experiences.

In giving an outline of my experience, I was troubled with seepage and eventually found it very necessary to put down bores to get rid of the surplus water. Having selected a spot where the water was close to the surface, I put a shaft 22ft. in limestone formation, then a bore down 82ft., and obtained a very satisfactory getaway. I realised that the water was coming in as fast as a 4in. casing would take, and was so convinced with the volume of water getting away that I immediately put down two more—one put down in clay formation to 14ft. sump and 116ft. to the getaway. This sump practically did not reticulate any water down the bore, and I attributed this to the clay soil where it was put in. The third effort was put down in stony formation, 15ft., and the bore 80ft., with the result of really good drainage. This last-mentioned has been working for four years. So convinced was I of the lowering of the water table, that I put down a fourth bore. This went down 16ft., and the water has been reticulating 108ft.

All three in the under-rubble formation are making quite a considerable quantity of water. The bore put in the clay formation proved that the water would not percolate, so it was decided to relieve that portion by putting in 20 chains of drains, this being to relieve the surface water into the bore. After being completed, drains ran for six weeks, and each week the volume of water diminished until there was no water coming through the drain. I put in a large number of test holes, from 7 to 12ft., so that it would be possible to test the water was receding or stationary. It was six months before some holes showed a difference, while other test holes dropped considerably, and the drains eventually ran no water whatsoever. The water table now, in some instances, is 12ft. below the surface and in many instances 7, 8 and up to 10ft. Wherever sand or rubble formation occurs, deep sumps do most of the draining; but where clay is encountered in sinking the sump, drains would have to be made to relieve the water. Where the underneath is formed of rubble, sumps 20ft. deep with 4 or 5ft. casing, is a more efficient and cheaper way of drainage. The Waikerie settlement has quite a large proportion of this type of porous soil, and only in isolated cases does clay formation continue to any depth. In most cases the deep sump is most favoured, and in one or two instances where drains have been in use for a number of years, the sumps have been deepened from 8 to 20ft. with the result that the drains cease functioning. The cost of a sump and bore casing and labour is about £55. A sump well built up and protected from storm water and irrigation, with a wire gauze covering properly protected, would thus save extra expense. If not protected, the storm water getting down from the outside will load it with silt, which is likely to deaden the bore and cause extra expense in cleaning.

In my experience, the growth of vines and greenstuff has improved considerably, and practically got back to normal conditions, although, of course, traces of salt may still be detected. One of the most important things to be considered first of all is where to put in the sump and bore. It does not always pay to select the lowest place. This is where some settlers are likely to make a mistake and not get anticipated results. It is finally suggested that a drill or some such machine could test the different depths and classes of soil, say to 25 feet. This should prove an excellent guide for these most important jobs, and save a considerable amount of labour and expense.

Mr. J. M. Darling's Work with Tile Drains.

Seepage can rightly be classed as the foremost difficulty confronting the irrigationist, and one requiring variable treatment in its occurrence, according to the class of land and the locality. Immunity is the privilege of only a small percentage of fruit producers in the Murray Valley, and the history of irrigation in other countries of the world adopting irrigation practices can be regarded as evidence of the consequences to be expected when action is not taken to deal with the cause.

At Waikerie, tile drains have been effective and satisfactory in some instances, this being particularly so on the original Village Settlement Area, with a depth of 4 to 5ft. of loamy sand before meeting the marl. Nature has endowed this locality with a good fall in the contour of the land and porous soil, enabling free movement of water to be conveyed through tile drains and eventually discharged into the lagoon.

While some instances of success have occurred in other localities; in Waikerie with tiles; a shaft to a depth of 20ft. with a 4in. or preferably 5in. bore sunk to a further 80ft. discharging into salt water strata has proven the most effective. This method not only gives better results, but is more economical than tiles. The sites for the shafts, however, are most important, and unless sunk in land loose enough in texture, allowing water to filter to the shaft, money would be unwisely spent. Stone and a coarse sand often encountered below limestone are preferred, but there are some localities where impervious marl occurs; even if the surface contour might induce one to sink in such territory, avoid it to save disappointment and expense.

While making this reference to impervious territory, it is opportune to refer to the heavy soil of the Valley flats; these most often become salted more than they suffer from water-logged land, the salting being caused from water accumulated in looser soil adjacent to the flat. Dealing with the cause early by removing the water, will save some of the richest soil, and if it is not allowed to become far injured, lucerne sown in alternate rows for two and even three years is a wonderful soil rejuvenator, and also an effective means of dewatering tight ground not amenable to drainage.

Drainage is undoubtedly an expensive undertaking, and the longer delayed the greater it becomes. To approach the matter from a commercial viewpoint, a settler is obliged to take into account the drainage cost as against potential income and decide accordingly, and in this regard, the decision is the more easy if made on the first indication of impending trouble, and quite often the installation of an irrigation pipe line to shorten the distance of irrigation, will prevent the decline of production and the expense of drainage.

These following salient points should be kept in mind, and leave such a big subject for further discussion.

Shorten the distance and time of watering to reduce the quantity of water excessively used.

Do not rely on tile drains in marl or tight soil, and only use them in deep sandy land.

Select the shaft and bore site in loose textured land, because drainage on good pervious sites can be expected for a distance of three chains and more.

Sow lucerne to dewater and rejuvenate the soil.

Papers read at Branch Meetings

Sheep on the Farm.

[F. ROBERTS, Murraminga.]

All farms should have a flock of sheep no matter how small, sheep are one of the best means of keeping fallows clean. They pack the soil, and add nitrogen as the result of their droppings. Their helpful qualities in a year like this, when buckbush is so plentiful, are untold; without sheep this plant would cause much extra work in its eradication for the preparation of seeding.

Sheep provide a nice income from wool and the sale of surplus sheep, after becoming fully stocked, besides supplying mutton for the home.

The only real disadvantage is when one has to cart water; in that case it is doubtful whether they pay; but when permanent water is assured, they are a valuable asset.

A broken-mouth ewe from a stony district will give good service two or three years longer than a broken-mouth ewe from sandy districts. When purchasing sheep procure them from districts similar to your own. Do not overstock; it is far better to keep the stock 50 below carrying capacity than 50 above, and one will get the extra results from wool and lambs.

The improvement of a flock can be attained by careful culling, but it is a gradual process, and a quicker income can be obtained by giving attention to feed problems.

To obtain the best results with minimum losses a close eye to the flock must be kept, as the fly menace is a grave one to the sheep owner. An examination of ewes that have been struck will invariably show that the tail wrinkle is the cause. Proper crutching is one of the best preventives of the fly pest. It is unprofitable to wait for the sheep to become dirty or struck by flies before thinking it is necessary to crutch.

The type of Merino Sheep now being bred for pastoral areas is an upstanding sheep with large frame, free from body and tail wrinkles. By an upstanding sheep is meant one that has a fair length of leg, besides carrying a good deep body. Such a sheep can travel long distances to water, and this suits our conditions, as sometimes sheep must travel two and three miles to water.

We have no fat lamb trade on account of distances to market; and for this district it would be uneconomic to get away from the above type of Merino.

Farmers should stick to their flocks and not be led astray by boom prices in favour of wheat alone, as both must go together for one to successfully farm in this area.

Black Pieces in Dried Apricots.

[JNO. J. ODGERS, Ramco.]

At first black pieces were found on the trays when boxing, but of late years the problem seems to have become more acute. Many growers find fruit put into sweats free, yet when packing; black pieces are found in the sweats. To a certain extent the authorities are to blame for this. Some years ago, to keep under the English 14 grains limit, they advised and insisted on using less sulphur, and growers have gone to the extreme. One grower, in all honesty, was proud of the fact that he had reduced the sulphur to a few ounces per box and obtained a good colour—how long it lasted was another question.

Years ago black pieces were found mainly in slabs. The reason given was that these were "pick-ups", and that "pick-up" fruit gave black apricots. Yet much "pick-up" fruit was a perfectly good colour, and probably the black pieces were more the result of the time the fruit was lying on the ground—the hot sand caused some chemical change in the sugar of the fruit that prevented the fruit from properly taking the sulphur. As time went on various other reasons were given, bird pecked fruit, slight fermentation etc. Although at times all these gave black pieces, yet at other times they were a perfectly good colour, so none of these conditions was a definite cause of black fruit.

Of late years the trouble is more acute, and during the last few drying seasons we have experienced definitely more wet days during harvest, particularly the season just ended. Some growers say that bird-pecked fruit taking in the moisture was the cause of the black pieces, but I would go further and say that the excess rain soaked the fruit, through the stem end particularly, and prevented the fruit from taking the sulphur. This season the fruit has definitely shown an insufficiency of sulphur, due to the excessive moisture in the fruit. For instance one grower stated that the cups of his fruit were full of juice within half an hour of lighting the sulphur, and yet that fruit showed lack of sulphur. It was moisture showing and not juice. That fact, may account for a lot of fruit this year, which although given the same sulphur as other years, was of a dingy, dull colour, with a greater tendency for pieces to go black in the sweat. Packing my own fruit I see it as it goes through the grader knowing what it was like when it came off the trays, and wherever I found black pieces, the fruit was decidedly moister. Further, the fruit picked at the end of the season, when the weather had improved, showed a much brighter colour.

Summing up the causes of black apricots, there are three things that are prominent:—

(1) Affected fruit is usually on the over-ripe side.
(2) There is always a lack of sulphur content.
(3) The black pieces are generally among the moister fruit.

From this it appears that to avoid many black pieces a grower must pick on the firm-eating ripe-side, give ample sulphuring on the over rather than the under side, and see that the fruit is thoroughly dried. It seems that moisture is a prime factor; in some way it appears to cause a change that releases the sulphur, and the fruit darkens.

COMMENT BY CHIEF HORTICULTURIST.

At the request of the Branch, Mr. Odger's paper was submitted to the Chief Horticulturist (Mr. A. G. Strickland) for comment. Mr. Strickland states:—

Darkening of dried apricots is due to a sulphur dioxide content below that necessary to prevent such darkening, and in practice, dark pieces result owing to failure of such pieces to absorb sufficient sulphur dioxide during sulphuring, or to too rapid loss of sulphur dioxide content some time after sulphuring.

Several points are worthy of mention in this connection:—

(*a*) "Firm" fruit absorbs sulphur less readily than fruit in "eating ripe" condition. All "firm" or "overripe" fruit should be discarded.

(*b*) Freshly cut fruit absorbs sulphur more readily than that cut some time prior to sulphuring. Therefore, sulphur as quickly as possible after cutting.

(*c*) Moistening of drying fruit through rain or other cause will lead to very rapid loss of sulphur content, and consequent darkening.

(*d*) Dried apricots intended for moist pack require a higher sulphur content—furthermore, the loss of sulphur dioxide from moist packed apricots is very much more rapid than from ordinary dry packed fruit.

(*e*) Irregularity in distribution of sulphur fumes in the sulphuring box may lead to some fruit having a lower sulphur content.

It will be seen that a number of factors may lead to low sulphur content, or rapid loss of sulphur content after sulphuring; observation is necessary to determine the chief factor or factors operating in any case, and action must then be taken to rectify the adverse factors.

SALVAGING DARKENED FRUIT.

Mr. W. R. Jewell, Agricultural Research Chemist in Victoria, has shown (rather contrary to expectations) that immersion of darkened fruit in warm water for about ten minutes, followed immediately by re-sulphuring, will restore colour to a remarkable degree.

Conservation of Fodder.

[F. C. KEEN (Pt. Elliot).]

On account of light rains last winter, and little or no early autumn rain this year, reserves of fodder are getting low on most farms. From the point of view of the Agricultural Bureau, such happenings cannot go unnoticed and without comment.

Because of the increased value of land, it has become necessary for properties to be stocked to their full carrying capacity. To do this safely, greater reserves of fodder are required. Although we are top-dressing regularly, that in it self does not seem sufficient in helping to supply the needed surplus.

The failure of rain at the right time, with our properties fully stocked, gives us something to think about. Unfortunately, we are not all able to irrigate either our pastures or crops. The practice of making Meadow Hay and Silage from surplus pastures is growing, but even here one is tempted to ask, *is such a practice sufficient?* It is possible by the cultivation *of portion of our farms* to produce from 5 to 6 times the amount of bulk per acre over pasture land. Only recently in a competition held in our State, 43 tons of maize were taken from one acre of land. Maize appears to be the most bulky crop that can be grown for silage. Experiments have shown that maize should be cut when the cob is well formed, as at this stage it contains its highest feeding value.

The advantages claimed for silage are:—It can be fed in winter and summer, and while maintaining the flow, has no injurious effects upon the milk. It is a succulent palatable ration when most needed. A greater quantity can be stored in a smaller space than is necessary for hay. Silage enables more stock to be kept with safety. It can be made in any weather. It enables coarse plants that may become waste to be turned to advantage.

Silage has its greatest advantage in the fact that it can be fed in the summer when the paddock feed is dry. I prefer hay for winter, because stock look for dry matter when the grass is green.

In growing crops to conserve, a system of rotation is essential to success There would be no such thing as bare fallow, but only continuous cropping in an ideal rotation. It would include one leguminous crop, one cultivated crop, deep rooting crops with shallow rooting crops, and a plan to conserve as near as possible the same amount of fodder each year. Unfortunately, the nature of our hilly country and the sparse summer rainfall do not allow us to reach the ideal. That should not stop us from attempting to find a rotation that could be practised *on the most suitable portions of our properties.* One that has suggested itself for the older land that has been down to clover for a number of years is as follows:—

Maize for silage, to be followed by a leguminous crop to be ploughed in, followed by potatoes, then barley and peas for silage, season permitting—maize again, and then back to pasture for three years. With the addition of phosphate and nitrogen fertilizers to the country that has been heavily stocked, a rotation of that nature should be possible.

Providing Feed for Sheep.

[K. H. McEwin (Kyancutta).]

One of the most pressing problems confronting the producer is the provision of food for all types of stock during the summer months of the year, and particularly the later part of the summer. Our natural grasses are such that they are of value only so long as they are green, and very quickly deteriorate in food value to stock during the early summer works, and particularly so when rain falls on them when they are dry. Our chief natural grass—barley grass—has little or no nutriment as a dry feed. It will merely sustain life and does not remain green for any long time; it is also a fodder which is quickly spoilt by summer rains. Consequently, it is necessary for the producer to adopt some method to provide good food to carry stock over this period. Of course, everyone tries to provide for their horses by cutting hay, but what of the sheep? They are the chief consideration in these districts.

There are two methods for provision of food for sheep:—Firstly, hand-feeding with cereals, and secondly, providing pastures.

Hand Feeding.

The easiest cereal to produce in this district is oats. Farmers can carry over large supplies of oats from year to year by cropping larger areas systematically. Sheep can be kept in good condition with a small quantity of oats per head per day, especially where there is still a small amount of natural grass to supply the bulk of their food. This is the usual procedure, but it has the one great drawback of encroaching upon the time a farmer has at his disposal for attention to his sheep, and consequently it is only poorly carried out. A farmer relying on this type of feeding must crop a sufficient acreage to assure a return capable of carrying him over the dry period. Another good fodder is peas, which have been found to grow successfully in districts of the same annual rainfall as Kyancutta. Practically all of the plant is consumed by sheep, and peas have an exceptionally good fattening property. In some districts the pea-straw is stacked and is fed by hand to the sheep. This seems to be an admirable means of ensuring a balanced diet for sheep, particularly if given before normal supplies of dry food run short.

Straw stacks are of value particularly as a standby for extended dry conditions. Admittedly stacked straw has only a minimum of food value, but it provides in drought times the bulk of the feed which is essential, and thus saves higher grade foods being used in larger quantities and decreasing the supply too rapidly.

Pastures.

The second method is to produce pastures, which are of two kinds—the winter growers that dry during the early summer and yet maintain high food values, and the summer green. The chief of the dry pasture grasses is Wimmera Rye grass, which should be used by all farmers in this district, as it does very well. Other suitable types are burr clover and one or two of the fescues, but none are so adaptable as rye grass.

The provision of summer greens may at first sound ridiculous, but on consideration it will be realized that they can be successfully grown. Usually during the summer months we receive thunderstorms, which are sufficient to carry greens of the right type through the summer. The chief greens which should suit this district are lucerne and primrose, both of which have been successfully produced on the Murray Lands, which have practically the same climatic and soil conditions as this district. Lucerne can be sown in two ways, either with the usual seeding operations, when 1lb. to 2lb. of seed are planted with wheat or oats, or as a pasture, when about 8lbs. to the acre is sown. This latter method gives a permanent pasture which will last for a period of six to eight years if judiciously stocked. The best type of soil for lucerne is on the heavy flats; germination in sandy soil is not always consistent. Primrose also provides excellent summer feed and does well on sandy soil. It is seeded later in the year, towards the end of July.

Whatever method is adopted, the producer must make up his mind that time must be spent to start operations, and remember that one year's failure does not mean that a thing is impossible. He must also remember that a sufficient quantity must be provided to get the best results from his sheep, both in lambing and the production of wool.

The farmer who goes especially for stud stock or export lambs of high quality should realize the value of silage. This food provides in summer the succulent growth of winter, and what better could be provided for his chosen animals? A small quantity daily gives excellent results. If once tried, silage would become the mainstay of summer feeding to small numbers.

Establishing Subterranean Clover and Rye Grass as a Permanent Pasture.

[P. Pope (Green Patch).]

For this district we cannot do better than concentrate on a mixture of subterranean clover, Wimmera, and perennial rye grass.

It is easy to establish with the rainfall of this district, and good results should follow. Thousands of acres of virgin scrub through the hills and along the south coast, which were looked on as practically worthless, are now being sown down with clover and rye grass and are producing a big percentage of the State's primary products, and I feel confident that it can do the same in this district. We have had good results with subterranean clover at Pearlah, and in every paddock where it has been sown it is spreading rapidly.

Last year was an exceptionally dry one and a severe test for this plant, but with the recent splendid opening rains, subterranean clover has proved by its germination to be able to stand up to dry conditions. We are dealing with soil that is of poorer quality than the soil of the home of the subterranean clover and cannot expect too rapid results. Nitrogen, for one thing, is lacking in the soil, and by establishing subterranean clover we overcome this difficulty at least.

Subterranean clover is relished by all stock, and is a heavy seeder, up to half a ton of seed having been harvested from one acre.

Last year we raked 20 odd acres and cleaned 2 tons of seed, averaging about 2cwt. per acre, but we did not get more than two-thirds the amount of seed on the ground. This paddock has only been established three years, being top-dressed every year with 1cwt. of superphosphate per acre. From an older-established paddock at Warunda a grower gathered between 5 and 6cwts. to the acre. Subterranean clover will probably be easier to establish in the lighter soils, as no matter how close it is grazed burrs will set under the surface. However, the heavier soil will give the greater bulk of feed. Not all seed will germinate during the first year, as in every pound of seed there is 20 per cent. of what are known as "hard seeds," which do not germinate until the following year.

As long as there is sufficient moisture to keep the plants green, the clover will continue to take fresh growth and set seed, a big advantage where we have late spring rains. The clover is still green for at least a fortnight after all other natural grasses have dried off.

Wimmera Rye.—This is undoubtedly a useful grass to establish with clover to give a balanced ration. Sown on its own it is detrimental to the soil, taking out more than it will put back. Stock take to Wimmera readily, and will clean up the straw when it has dried off. Unless sown early it will not make much headway through winter months. This plant thrives best under milder conditions, but it makes up for it towards maturity, when it makes remarkable headway. It sheds its seed easily and as soon as it dries off. It appears to like the sandy, light soil best.

Perennial Rye.—There are several strains of this plant. So far, we have not had much success with the English perennial rye. This year we are trying out the Colac variety, as it grows under drier conditions. Where it is sown with the clover, fairly good plants are showing, but it appears to die out when sown alone. Better results will be obtained if rye is not allowed to seed the first year. The reason is that when it is allowed to seed the plant ceases making fresh growth, and the roots do not penetrate deeper in search of moisture. Perennial rye does not make very much growth in winter, but the fact that it is a perennial and is always there, summer and winter alike, to give stock something green to pick at, makes it a valuable plant.

Two other perennial plants that would probably be worth trying in this district are Phalaris tuberosa and African grass. Phalaris we have tried in a small way; it will stand up to close grazing, a very important factor where sheep are grazed.

ESTABLISHMENT.

The best way to establish Clover and Rye Grass is with the crop. It is given every opportunity to seed itself, and it has no detrimental effect on the crop. Care should be taken not to sow too deeply, otherwise a poor germination will result. With small seeds better germination is always obtained if sown as near the surface as possible.

Rate of Seeding.—We are using this year (sowing with crop) 3lbs. subterranean clover, 1lb. Wimmera rye and ½lb. Perennial rye (Colac strain) with 1 bag superphosphate to 1½ acres. The cost per 100 acres for seed this year is approximately £15. The quantity per acre depends on how long one is prepared to wait for a good stand of feed. For instance, 1lb. of clover seed will not make much feed in the first year or so under usual grazing conditions; whereas, a heavier dressing—from 3lbs. upwards—sown with the crop and allowed to seed the following year will give a good stand. The extra grazing obtained by giving a good dressing the first year will pay two or three times over for the extra cost of seed. Where the harvester is used to take off the crop, leave the tailboard from Drake sieve open to allow the rye grass to be scattered back on to the ground. If hay is cut at the right stage, or a little earlier than usual, we have found the Wimmera rye to run to head again.

Management.—Pastures should be top-dressed at least every year. The most economical amount to use would be from 1cwt. to 1 bag per acre. The addition of sulphate of ammonia with superphosphate will give better results. A 5 acre patch of clover sown two years ago with superphosphate and ammonia, 1-1 mixture, gave wonderful results, and the 2lbs. of seed sown has now completely covered the ground.

Rotational Grazing.—This can only be done successfully where farms are subdivided into 100 acre paddocks or smaller, according to the size of the property. Not only does rotational grazing help the pasture, but it helps the stock. Sheep like nothing better than access to a fresh paddock.

Pasture Harrows.—The benefit obtained from harrowing is that all droppings from stock are distributed over the paddock. Harrowing loosens the surface, thus giving all seeds a better chance to germinate. By establishing a permanent pasture, the carrying capacity is greatly increased, and larger-framed and healthier stock are bred. The cost of establishing pasture is nothing compared with the extra returns obtained.

Maintaining Sheep from Autumn to Spring.

[FRANK MASTERS (Verran).]

Late autumn and early winter is usually the time of feed shortage for sheep. Unless fodder is conserved, sown or otherwise provided, loss in condition ensues, lambs receive a setback and in many cases die, while a break may occur in the wool.

Recovery of condition in sheep and lambs can only occur with greater expense in feeding, while decreased prices are received for faulty wool, all meaning losses that could have been prevented. Sheep should be kept in good condition to enter the period when the stubbles have been eaten out. One method of providing the necessary feed would be by sowing Sudan Grass in October and November. This would be available in conjunction with and after the stubble feed has gone. Eight pounds of seed combined in with ½cwt. of superphosphate whenever rains occur and after the risk of frost, should give a good stand which could be either grazed or cut for hay. Last year 50 acres of Sudan grass provided feed for 15 head of cattle for four months, or an equivalent of 75 sheep. Thus the 50 acres carried an equivalent of 1½ sheep per acre for the period to June. However, conservation of fodder must be attended to in order to ensure the flock being carried through the lean period of the year, preferably by ensiling a portion of the crop of oats, barley or wheat—preferably silage, because of its succulence, it being about equal to green fodder. Stocks of hay may be provided, or oats or barley grain, or failing these, even wheat. If hay or grain is stored, protection against vermin and weather is essential. Mouse-proofing the stack and storing the grain in tanks or bins would provide this. With fodder provided as above, the flock should be in good heart and condition to reap the benefit of the green feed when it comes. To hasten the latter, the sowing of rye, barley or oats should be undertaken. In a good grass season this may be the foundation for providing for the ensuing lean period.

"Does it pay?" is, of course, the crux of the position. Emphatically it does. In a season like the present it makes the difference between getting lambs off as freezers or having them on hand to carry through next year with stocks of feed at a minimum. It means safety in stocking the holding to carrying capacity, thus making economical use of time, labour and fencing expenditure. These fodders being mainly returned to the soil, enrich and benefit it and increase its carrying capacity. Thus it will assist in building up the fertility of the soil for all future cropping, whether for grain, hay or grazing. Let it be remembered that the value of the farm is governed by its earning capacity, and the more that is stimulated by the current practice of husbandry the better for owner and community. Always keep an eye on that lean period of the year and the lean seasons that come now and again; and if wool is the sole aim, prevent the break and grow the soundest staple possible.

The Breeding Ewe.

[W. A. CLIFFORD (Penola).]

Great care should be taken in selecting a Merino ewe for breeding. For good lambing pastures well-grown 2-tooth ewes are old enough for mating. Ewes too small as 2-tooths can be kept dry until 4-tooth. Ewes that are weedy, with poor quality wool, or showing wrinkles around the tail, should be rejected. If lambing country is only a small percentage of the holding, it would not be advisable to mate ewes until they are 4-tooth. Always mix the maiden ewes with the older ones, both for mating and lambing. The young ones are too wild in a paddock by themselves.

Rams.—Buy the best ram you can afford, taking care to get a thick fleece with plenty of character, and avoid hairy breeches and wrinkles over the body. A good fold on the neck is all that is necessary. See that the ram has a straight back and is strong and healthy.

Mating.—On the black plains the ewes should be mated about the middle of March, to get the lambs from the middle of August until the end of September. One is sure to have feed by then, the days are longer and most of the rough weather gone. Early lambs on the plains in a bad season become poddies, infested with worms and receive a poor start. The ewes also suffer and cut less wool if suckling the lambs during the winter period, unless they are hand fed. If one's land is light and is sure to grow early feed, or one has early clover to pasture the young lambs, it would be better to get them in June. Before mating the ewes it is advisable to crutch them; but be careful not to shed them on a hot day or there will be trouble with the flies. There are plenty of cool days, even in March.

I believe in rotation grazing for two reasons: First, sheep kept on half the land are more easily looked after for flies in the summer and later for lambing; second, a paddock after a fortnight's spell is fresh. Even during the summer there is the English dandelion, Mother Dutton, and other summer growing fodders, which become a mass of yellow flowers. If constantly grazed, the plants are eaten off and hardly ever grow to a bud.

The ewes should be well breeched about a month before lambing; also taking a cut off above the teats. This latter makes it easier for the young lamb to find the milk. Any stray wethers should be taken out. Keep the ewes in good condition during the carrying period. Scrub country—which is no good for young lambs—is also no good for the embryo. Watch the ewes well while lambing, by going around every morning. Take care not to miss any that are cast or in difficulty. If a cast ewe cannot walk when picked up, turn her on to the other side and leave her for ½ an hour. Give the lamb a suck if it is alive. If a ewe is strong she will always run away when picked up; but she will generally return to the lamb again. Beware of flies on cast ewes in September.

When the lambs are from four to six weeks old, get them in and mark them. A sharp knife is the best to use for cutting off tails. I always use fingers for drawing instead of the teeth. With practice the fingers become quite efficient, and it is not necessary for the holder to squeeze the lamb so tightly.

Establishing a Farm Flock.

[A. Ramsey (Pinkawillinie).]

Sheep on the farm to-day are of great economic worth, especially in this district with an uncertain rainfall for wheat growing. Consequently. the rotation must be widened; that is, less wheat grown, more sheep kept. Sheep not only increase the fertility of the soil but increase one's income with very little cost. The average farmer is an excellent wheat grower but not a good sheep man, and the quality of the farm flock must be improved and better managed if farm profits are to be maintained.

Establishing a farm flock is an all important factor, because profits largely depend on the quality of the flock. It is first necessary to consider just what are the chief objects in view. For example, the farmer's main object may be fat lambs, and he would look upon wool as a secondary consideration, or he may maintain a flock with the dual purpose of wool and fat lambs, or wool may be the chief aim. Locality and the nearness to markets and pastoral conditions must always be the deciding factors as to which branch of sheep husbandry will be the most profitable when considering the best type of sheep to keep. I favour the Merino type, for various reasons. Should a farmer choose the crossbred, he is going to try and produce an export lamb which is not suitable for this district. Firstly, there is not an export market within reasonable disstance; and secondly, the rainfall is too low. This year, for instance, breeders of export lambs here are finding it difficult to put their lambs on the market, owing to the lambs being in an unfinished condition, due to the lateness of the season. I would strongly favour the Merino for that reason. Selecting the flock is the main factor. The standard of quality of Merino ewes on many wheat farms is deplorable, and it is of the utmost importance to the wool industry that they should be improved. It is only natural that a breed so widely spread as the Australian Merino will vary in type. Climatic and pastoral conditions and different breeding ideals are responsible for the variations. The breed may be classified as follows:—1st, the large plain bodied, strong woolled, strong constitutioned type; 2nd, the medium type, that is medium in size and wool quality, usually found in pastoral districts with a fair rainfall; 3rd, the small, wrinkly, fine woolled, weak constitutioned type; it produces superfine wool, but it is not profitable. For farm conditions the first type is ideal. They are great wool producers, excellent doers, and not so subject to blow fly strike as those with body wrinkles.

For those that can finance the purchase of high-class stock it is a simple matter to establish a good flock. It is much more difficult, however, to maintain a high standard. I would suggest purchasing an even line of plain ewes (young for preference) and then a fairly good ram. It is a great mistake to mate ewes with a ram of inferior type. It has been proved by stud breeders that 50 per cent. of the progeny will resemble the parents, 25 per cent. will be below their standard, and 25 per cent. will be of a little better class, thus showing the necessity for culling young sheep. Yet many farmers are content to use any old cull rams, overlooking the fact that 50 per cent. of the lambs resemble their sires, and 25 per cent. may even be worse. The farmer breeder cannot go into breeding to the same extent as the stud master; but he can, and should, practice it to the extent of always using rams of the same blood strain by buying them from the same stud. Every stud flock is bred carefully on blood lines. This is a very important point, because unless it is practised, evenness in type can never be hoped for. For example, two studs may be even as regards productiveness, yet the sheep may be very different in general type and conformation, and should they both be used on the same flock of ewes the result must be a wide variation in type in the progeny. When selecting rams, see that you do not get those with wrinkles around the tail, or with too many body wrinkles. These are usually more susceptible to blow fly strike. However, folds on the neck are desirable. There are some farmers who favour the plain sheep throughout. For example, where a breeder goes in for plain neck rams his progeny will cut much lighter wool, which in the long run means a loss to the grower in his wool cheque. Also his flock will deteriorate, and it will not be many years before his flock will be of an undesirable standard.

The Value of Sheep in Conjunction with Wheat Farming.

[C. Rodda (Boors Plains).]

Sheep are the most payable sidelines on average wheat farms. The packing of the soil, keeping weeds in check on the fallow, and the manurial value of the sheeps' droppings on the land are important considerations in the keeping of sheep, besides the sale of wool and lambs, and supplying mutton for the home.

To obtain the most value from our flocks we must pay more attention to the conservation of fodder. Silage seems to be the best way of doing this, but for several years conditions have not been favourable in this district for this method. Oats, barley and chaff can also be used to advantage, but silos are needed to store grain successfully over long periods. Silage has several important advantages in fodder conservation. It is not damaged by fire, rain or mice, and it will practically take the place of greenfeed for ewes rearing lambs, thereby keeping an early drop of lambs from receiving a serious check in a late feed season. If oats were grown and cut early for silage, the plants would grow again, and if good late rains fell, the oats would make late greenfeed or could be harvested for grain. In the near future, farmers generally, more especially power-farmers, will not be able to consider sheep only as a sideline, but as an invaluable adjunct to wheat farming, if soil erosion and loss of soil fertility are to be prevented. By growing fodder crops for sheep (in this district generally oats or barley) the crop rotation is widened, and higher yields will be obtained from succeeding wheat crops. Oats are the most valuable rotation and fodder crop, and are also valuable for prevention of take-all. Varieties, such as Early Kherson, give early feed, and others, such as Guyra and Algerian, will come on later and remain green longer. Keeping a flock of Merino ewes and mating them for fat lamb production seems to be the most profitable method for average size farms. One drawback is that keeping the ewes on the fallows long enough to keep weeds, such as barley grass, well in check is not in the best interest of producing best quality fat lambs; and a very small flock of wethers is not nearly as advantageous as a large flock for keeping the fallow clean. However, the ewes and lambs are the best proposition, unless the farm is large enough to carry 100 to 200 wethers, besides a flock of about 200 ewes.

Last year the prices of fat lambs and wool were above average, but fair returns can always be expected for quality lambs, while the wool market will have its ups and downs like the rest of our products.

By keeping sheep in conjunction with wheat, we have not all our eggs in one basket.

Mineral Deficiency.

[E. W. YEATES (Hartley).]

Under normal conditions there are only four minerals which are absent from soils, namely, phosphorus, nitrogen, potassium, and calcium. A deficiency of any one means stunted growth and a deficiency of that mineral in the plant itself.

Phosphorus is the most important in Australia, because of its scarcity in our soils. Its application to a deficient soil means increased yields of grain or pasture, as well as greater feeding value. It stimulates legumes, and crops produce more seed, because there is a higher percentage of phosphorus in the seed than in any other part of the plant.

Nitrogen is generally deficient in high rainfall areas, because it is easily dissolved and rain leaches it away. A scarcity of nitrogen means yellowing of the leaves and a general decrease in the bulk of growth.

Potash is rarely absent in soils that are not used for frequent heavy cropping. But where mangels, potatoes, maize, or any crop that makes a large amount of sugar or starch is grown, dressings of potash are beneficial.

Lime is required by all plants, especially lucerne and clovers. A deficiency in the soil is usually shown by the growth of such plants as rushes and mosses. In this district there is an abundance of lime, and its application is not necessary, but on such lands as the Murray Swamps lime has helped to convert sour, sticky soil into some of the heaviest-producing land in this State.

A deficiency of minerals in pastures means a deficiency in the feed of grazing stock, and this has serious consequences. Animals are stunted in growth and are less resistant to disease. Before the days of superphosphate, cripples were prevalent, especially in dairy cattle, but now this complaint is rarely heard of. Cows produce less milk, have weaker calves, and show a craving for bones, bark, or rag, if minerals are deficient in their diet. From bones and rubbish they may pick up bacteria, which causes the disease known as dry bible. Cows in milk should have their feed supplemented by a mineral mixture containing bonemeal, salt and sometimes di-calcic phosphate; but where superphosphate is supplied to the grazing land, the latter is not very often necessary. A cow in calf under-nourished in minerals will often draw upon her body to supply the unborn calf, and this will result in decay of the bone and lameness.

Poultry given plenty of greenfeed receive a certain amount of minerals from that source, but a mixture containing shell-grit 89 per cent., ground charcoal 2 per cent., ground sulphur 2 per cent., bone meal 2 per cent., salt ½ per cent., wood ashes 3 per cent., Epsom salts 1 per cent., and iron sulphate ½ per cent. given in a self-feeding hopper will supply all minerals necessary for the production of egg and shell.

Pigs fed on milk and greenfeed are generally well supplied with minerals, but grain-fed pigs need free access to a mineral supplement containing sweet bone meal 48 per cent., charcoal 48 per cent., and common salt 4 per cent. Sow's milk is naturally deficient in iron. To overcome this, the piglets before birth receive a supply of iron from their mother. Thus sows sometimes eat their young to overcome their own craving for mineral. It can be seen that to give piglets a quick start and to minimise losses, sows about to farrow must be well supplied with minerals.

Plough or Cultivator for Fallowing.

[C. D. McCREA (Blyth).]

If the land to be fallowed is of loose or sandy nature, it may be broken up with a cultivator and will make a fairly good job. However, many farmers would not call it good fallowing, because the weeds and grass growing on the paddock would not be turned under as thoroughly as would have been done by a plough. It may be claimed that in a dry season, when deep fallowing is not considered necessary, the cultivator could be used to advantage, as it would break up the soil, but not too deep. However, to make a good job, the land would have to be worked over twice with the cultivator, and this would take extra time and extra power. If the land to be fallowed had not been cultivated for several years, under ordinary conditions, the soil would be hard and set, and a cultivator would be quite unsuitable, and would only scratch up the surface of the soil.

Under these conditions, although the farmer was a believer in the cultivator, the plough would have to be used. Also, late in the season, when the ground is becoming hard, the cultivator must be put aside and a plough used to finish the job. If deep fallowing is believed to be necessary, then again the plough must be used; the cultivator cannot be used for deep fallowing, excepting under most favourable conditions.

The appearance of a paddock fallowed with a plough is much better than that of one gone over with a cultivator. There are no weeds or grass showing above the ground where the plough has been used. It is difficult to compare the two implements, as both may be used to great advantage under different circumstances. But, generally speaking, it may be said that the plough as an implement for fallowing is far superior to a cultivator. If a landowner had a plough and no cultivator he could carry on under all conditions, but on the other hand if he had a cultivator and no plough, there would be times when he would find himself in difficulties.

Eradicating "Basket Creeper" (Fumitory).

[J. H. Hurst (Blyth).]

This weed, known in this district as "Basket Creeper," is called by several names, but the correct name is Fumitory. There appears to be two ways to control it —namely, growing wheat to compete with the weed, or destroying the weed before sowing. Some prefer to grow an early wheat after one early cultivation, in the hope of the wheat getting ahead of the weeds. This, to a certain extent, may be successful, as the wheat should germinate more quickly than Fumitory seed. However, if later the wheat should receive a check, the weed continues to thrive with disastrous effects to the wheat. A better plan would be to take good, clean fallow, give it a good cultivating and harrowing after the first autumn rains, allowing sufficient time for the weed to properly germinate, then later sowing with an early wheat, followed if possible by two harrowings before the wheat is up. Early Gluyas or King's White should be suitable varieties to sow. Fumitory, as a rule, takes about a fortnight to germinate. The Fumitory plant is easily killed, and if treated as suggested, most of the first crop should be destroyed. It will continue to come up, but with the first crop destroyed the wheat should be able to be well away and able to check what little appears later. It is almost useless to attempt to eradicate this weed unless farmers are prepared to strictly adopt the three-year system, as it appears that it is in paddocks where wheat has been sown every other year that the weed is most noticed. Fumitory was known in this district over 40 years ago, but it is only of later years that it has been so troublesome. Perhaps the increased spread of Fumitory can be attributed to factors such as overcropping with wheat or the greater number of sheep going through the saleyards from one farm to another, since farmers have gone in for sheep. Yet another cause, and perhaps one that has had most to do with the spread of Fumitory, is the succession of dry years of late. The wheat has had a check at some time during its early growth for lack of moisture. The check, perhaps, not serious, was sufficient to allow the weed to go ahead while the wheat was practically at a standstill. It is possible that with a return to wet winters Fumitory may be naturally exterminated.

Clearing a New Block.

[B. W. Rodgers (Brimpton Lake).]

When starting on a raw scrub block, the first thing to decide on is a suitable position for the homestead. This should be situated on some rising ground or on a slope, to drain the stable, yards, and other sheds, &c., during the wet winter months. If possible (and perhaps most important of all) the homestead should be situated near a supply of good stock water. This, however, is rather hard to determine, as fresh water wells in this locality are rather difficult to locate, and a likely-looking place for a dam often proves a failure as regarding holding water.

However, I favour the dam as a first water supply, with a bore for water later, whenever a few days can be spared.

One of the first outbuildings should be a stable to house, say 10 or 11 horses. A stable 33ft. long and 20ft. wide, built so that it can be enlarged later, should be large enough. In the first few years it would almost pay for itself, as feeding in the open yard is not satisfactory in this district. Winters are often exceptionally wet, which means loss of chaff and also loss of vitality of the working horses through exposure during the cold nights.

The first clearing should be done near the homestead, firstly for convenience, and secondly as a safeguard from scrub fires. A strip of the natural timber two or three chains wide should be left standing on the north and west side of the homestead as a windbreak, but at a distance that will not prove dangerous should this catch fire.

For knocking down the scrub a heavy log with an iron shoe should be used, unless the scrub is very heavy, when a roller can be used. The log should be used where possible. It leaves fewer snags and deals with the undergrowth more effectively. If the piece to be cleared is heavily timbered, it should be done before the summer, so that it will be well dried by the time burning takes place. If the scrub is light it should be logged both ways a few weeks before the burning season, and burnt while half dry; the broken boughs seem more inflammable while in that stage. Four horses on each end of a 20 or 25ft. gum log will work it comfortably. Wherever possible the scrub should be logged a few yards beyond the boundaries and the land cropped until such time as a fence is erected; this will do away with the job of clearing scrub away from the fences every year or so.

The First Crop.—A disc plough and disc drill should be used for preparing and sowing the first crops. The new land for cropping should be ploughed after the first rains, harrowed and sown with 45 to 50lb. of wheat, and 80 to 90lb. of superphosphate per acre. On account of the uneven nature of new land a deep ploughing is necessary, so that the lower patches of ground will not be missed. A portion of the new land should be sown with oats, which could be cut for hay. The matter of providing feed for the team on a new farm in this district is one of the most difficult problems a settler has to face. Very little paddock or natural feed can be obtained, and a lot of tedious work has to be done to make the hay ground fit for a binder, and the stubble burn (which is most essential for killing the mallee shoots) is lost. Reasons for fallowing new land are:—Higher yields per acre are obtained and more straw is grown, which means a better stubble burn. The land can be prepared for seeding in less time, as the fallow will be easier to work and less strenuous on the team than if breaking up raw, new land. More green stumps will have been ploughed out and loosened, and there the shoots will be in a weaker condition and less able to survive the first stubble burn. A 10ft. stripper and power winnower, or hand winnower with power pulley, is preferable for harvesting new-land crops. Even if all loose stumps and stones are picked off the land, it still remains rough and uneven for a harvester or header. The stripper having less working parts usually proves most satisfactory.

A fire rake is an absolute necessity, and as soon as possible after the burning season opens it should be put into action, the hottest days being chosen for the work and care being taken not to travel fast, but to allow the flame to pass slowly over the shoots.

The next crop on the stubble land should be a crop of oats, some of which could be cut for hay—that is, if the land has been given a ploughing or cultivating before sowing. As much of the oat crop as possible should be reaped and the stubble burnt. By this time the land should be comparatively free from shoots, and it can then be either left out for a year or fallowed again and sown with wheat; wheat sown on stubble land should be avoided, as in the majority of cases it gives a poor return.

At this stage some fences should be erected and a few sheep kept, but care should be taken not to over-stock. When sheep have to be run on stubble that is to be fire-raked, or on land where a grass fire is intended, they are apt to spoil it to a certain extent for burning. Also while the land is in a more or less new state it has not the carrying capacity of the grass-land on older farms. Other improvements around the homestead may be added from time to time as the settler's financial position improves.

Care of Horses' Feet.

[J. J. Elliott (Robe).]

One sees a great number of horses with bad and faulty feet, owing largely to inattention and neglect.

The remedy is firstly to handle all yearlings, tie up each to lead and then handle legs and feet; then purchase a horse rasp (18in. in length for preference) and a pair of hoof parers. Trim the hooves to shape, but on no account interfere with the frog or the sole of the foot, as the frog acts as a cushion to alleviate jar and shock on the hoofs and legs. Nature provides that the frog will shed itself of any superfluous growth, which gives it the necessary protection from injury. All that is necessary is that the walls of the hoof be kept in proper shape during the growth of the animal.

Very few horses require shoeing while working on the farm, as they are working under natural conditions; but there are times when it is necessary to shoe them, such as when they have to work on macadamised roads. This work is not under natural conditions, and the wear of the hoof is greater than the natural growth. Consequently, if not shod, they will become tender footed, lose condition, and will not be able to do the work.

Shoeing a Horse.—Firstly take the hoof parers, if the hoof is unduly long, and remove the superfluous growth of the walls of the hoof. Then shape the hoof correctly with the rasp, and level the under surface of the wall so that the horse stands true. Do not interfere with the frog and with the sole of the foot, or as little as possible. Do not cut out the bars of the hoof, which are on the soles on each side of the frog. The bars are a protection of the heels to avoid contraction.

Select a set of shoes large enough to fit the hoof, shape and fit them to the correct outline of the hoof and surface levels. Use the knife sparingly, and always fit the shoe to the hoof and not by any means fit the hoof to the shoe. Use as light a shoe as possible, without it having a tendency to bend or become uneven. See that the heels of the shoe are of the correct length, if they are too short corns are likely to occur; also undue strain is placed on the back tendons of the leg, and this may cause lameness. If the heels of the shoe are too long there is a tendency for the hind feet to overreach and tear off the front shoes, probably with bad results to the hoof. Spring the heels of the shoe slightly, and allow for the expansion of the heels of the hoof to avoid contraction.

Proceed to nail on the shoes, using six nails for light horses, seven for medium, and eight for heavy draughts. Use nails in proportion, say, sizes 6 to 7 for light horses, 7 to 8 for medium, 8 to 10 for draughts. In driving nails do not drive too high. By doing so there is a chance of causing a prick, as the wall of the hoof becomes thinner as it reaches the coronet.

In clenching, ease the points of the nails down with the hammer and pincers, clear off with the rasp lightly, and on no account rasp the wall of the hoof above the nails. With practice the nails can be driven in an even line.

Do not leave the shoes on for too long a period, say two months at the most. As the hoof grows, the shoe becomes too narrow and too short and has a tendency to cause contraction and corns, also lameness through undue strain on the tendons. A small amount of attention will probably save considerable trouble.

Cement.

[E. B. Kane (Warramboo).]

Cement offers a solution to anyone about to erect a permanent structure, and although it is generally accepted as such, it is all too frequently sacrificed in favour of less durable material that may be more quickly erected. There is little doubt, however, that in cases where concrete has not fulfilled expectations it is invariably traced to such causes as faulty workmanship, damaged cement, the presence of dirt and other foreign bodies in the mix, or perhaps more often to insufficient cement. The following are some of the preparations necessary for making a permanent job:—A good board or iron sheet is essential to turn the batch on. A cement floor also makes an excellent place for such work, but it must be washed frequently and thoroughly to avoid sticking. Gravel must be screened to remove sand and stones that are oversize. This does not mean that the same sand may not be added later, but it is added then only in the correct proportions. A gauge box or bucket should be included for measuring each batch. A watering can should be used in preference to a bucket or hose, as this gives a more even distribution of water. Clean water is essential. However, in cases where salt or very brackish water is applied, although it may retard the setting, no ill effects will follow, except that white patches appear occasionally on the finished work. These may, however, be removed by washing with water to which a little spirits of salts has been added. To mix a batch, it is advisable to keep the sand separate from the metal until the sand has been mixed thoroughly with the cement, thus saving handling of metal more times than absolutely necessary. The sand and cement mixture is then placed on the metal, and very little more dry mixing is necessary. The water is then added, care being taken that the mix is not made too wet, as this weakens the concrete, and cement that is over-diluted does not regain the same strength. Furthermore, particularly when water is added after turning, the cement is washed away in places, in which case the batch should be mixed once more. In fact, as the cement is the sole binding agent, good results are only obtained in cases where the mixing is both thorough and uniform.

Reinforcing.—Where the structure is to be subjected to undue pressure, such as above doorways, steel bars should be placed in the mould, first bending the ends to a hook-shape to prevent slipping. The main thing is to obtain a maximum strength from a given quantity of cement; therefore, the correct amount must be observed. It is advisable to use gravel of varying sizes, also sand of a mixture of both coarse and fine to ensure the greatest density possible. To do an average job a 4 to 1 mixture is used. This means 4 parts sand to 1 part cement. The stone is not mentioned when referring to the strength, as it is never exactly known how much will be used. Seldom, if ever, is more than twice the quantity of stone to that of sand and cement gauge used without producing a batch that is too coarse to pack properly. A mixture with the studied amounts of each component will prove more durable than one where the stone is used sparingly, although the latter mixture is far more easily handled.

Curing.—Curing is by far the most important feature and possibly the one that receives least attention on a small job. The work must be protected for 10 days after completion with wet bags or sand; perhaps both, because drying too rapidly will cause cracks, and the concrete will not stand the wear as will work where the chemical action of drying is allowed to take place gradually. In fact, some of the best results are obtained when the work is allowed to set under water.

HINTS.

Turning the sand and cement together dry for some time ensures a thorough mixture and saves a good deal more work than where the gravel is added at the beginning.

Water.—A regular measure should be used after ascertaining the necessary amount in the first batch. Water should be added gradually or the cement will be washed away, especially when water is added after turning. Care should be taken to keep the size of the batch at such a quantity that it may be handled and placed quickly, bearing in mind that cement takes about 20 minutes to set after wetting.

Concrete on the Farm.

[J. R. MACKIE (Yadnarie).]

The main principles governing good concrete work are:—The materials must be free from vegetable matter and clay. The stone or gravel should be hard and of varying sizes. There must be sufficient cement. The materials must be mixed to an easy working consistency, neither sloppy nor crumbly. There must be a thorough mixing of the cement with the other materials before adding water.

Vegetable matter, such as leaves, sticks, grass, &c., will not bind with cement, and form a weakness in the mass owing to these particles eventually decaying. The best way to remove such matter is by screening the sand. The strength of concrete depends upon the breaking-strain of the stone in it; consequently a good job cannot be made out of soft stone. When concrete expands or contracts, as it will do under varying conditions of temperature, it cracks along the line of least resistance, which is where the softest stone lies. The space between the big stones should be occupied by smaller stones, with still smaller stones between, and so on down to gravel and sand.

The aim is to get the surface of all stones, sand and gravel coated with cement. For good, economical work use a mixture of 1 of cement to 6 of sand (including gravel.) The amount of stone may vary considerably, but it must be hard stone, such as blue metal, screenings, quartz, granite and ironstone, all of which are good; soft sandstone is practically no good at all.

The uses for concrete on a farm are numerous and include floors, buildings, tanks and fence posts. It is always advisable to reinforce concrete work, especially tanks (wire netting is excellent as a reinforcement) and fence posts, which are best and easiest reinforced with iron bars (old standards are very good.) When doing so, bend the bars zig-zag and lean them from one side to the other, for whereas the greatest strain on a post is horizontally, a sudden jar from a cart wheel may split it vertically.

WHEAT CROP COMPETITIONS.

Members of Branches of the Agricultural Bureau will be pleased to learn that the Government has agreed to increase the vote for Crop Competitions on the 1937-38 Estimates from £100 to £225.

Previously the amount allotted was distributed equally among the Districts. A new schedule has been approved and the amount on the 1937-38 Estimates will be distributed on the following scale—"SHILLING FOR SHILLING UP TO 10s. PER ENTRY."

Intending competitors are reminded to send their entries to their local Secretaries as early as possible.

Activities of Women's Branches

ALAWOONA.

Mrs. Flint presided over an attendance of 9 members on 2nd April, the following papers were read.—"Poultry Farming," Mrs. Flint; "Dressmaking," Mrs. Cooper; "Tomato Growing," Mrs. Watson "Casserole Cooking," Mrs. Wright.

Music.—A paper was read by Mrs. Jeffreys:—Of the many kinds of music, that which makes most appeal to the average listener is programme music. The writer made reference to descriptive compositions and said how it was possible to understand the story which the orchestra portrayed. Mrs. Jeffreys thought that more should be done to assist local artists of promise, so that they could go abroad and continue their studies.

A further meeting was held on 23rd April, and took the form of a "Question Box." (Secretary, Mrs. W. Cooper.)

AUBURN.

The meeting of 30th April, was attended by 15 members and was held at the residence of the Secretary, Miss L. Dennison. Members discussed "Meat Dishes," and some good recipes were exchanged.

BALUMBAH.

Members met at Mrs. Jericho's homestead for the meeting held on 5th May, which took the form of a "Question Box." At a previous meeting it was decided to thank Sheaoak Log members for parcels of books and magazines. (Secretary, Miss H. Jericho.)

BALHANNAH.

Mr. Love of Amscol Limited, addressed the April meeting on the subject of "Food Value of Dairy Products." (Secretary, Mrs. P. Grow.)

BEETALOO VALLEY.

The meetings held on 22nd March, and 19th April, were devoted to a resume of the proceedings of the Mid-North Conference. (Secretary, Mrs. L. Pearce.)

BELALIE.

Twenty-five members and 14 visitors attended the April meeting, when the programme was provided by members of the Wepowie Branch.

"A Trip to Darwin," was the subject of an address given by Mrs. W. J. Spafford at the May meeting. On leaving the district Mrs. Sandercock was presented with a gift in recognition of her services to the Branch. (Secretary, Mrs. E. L. Orchard.)

BOOR'S PLAINS.

Mrs. M. Wright placed her home at the disposal of members for the April meeting. A "Sponge Cake Competition" was won by Mrs. A. Adams.

On 6th May, Mrs. N. Cross presided over an attendance of 10 members when a paper "Salads for Cold Meat Dishes," was read by Mrs. R. Yelland. (Secretary, Miss L. Stanway.)

COONALPYN.

The following papers were read at the March meeting:—"Home Remedies," Mrs. Potter, and "Sponge Cake Making." (Secretary, Miss E. George.)

Reported by the Secretary as one of the most successful meetings of the Branch was that held on the 21st April, when Mr. H. Dunthorne gave a demonstration of "First Aid."

COONAWARRA.

Twenty-six members attended the April meeting when the local Station Master, Mr. Walsh, gave an address and demonstration on "First Aid." (Secretary, Miss O. Lear.)

ECHUNGA.

On 7th April, Mrs. H. Gilbert gave a demonstration of "Rug Making," to an attendance of 18 members and visitors. (Secretary, Mrs. F. Dennis.)

GEORGETOWN.

Twenty members were present at the March meeting. Papers were read by Mrs. M. McDonald, "Butter Making," and Mrs. G. Smallacombe, "Hints to show Exhibiters."

Mrs. Lyons was welcomed on her return from a trip abroad. (Secretary, Miss J. Crawford.)

GLADSTONE.

Not very many Women's Branches have held debates, but Gladstone members debated the subject "Large *versus* Small Families." Mrs. McDonald of the Georgetown Branch adjudicated. She gave a decision in favour of the team which supported small families, and complimented both teams on the subject matter of their arguments and the manner in which criticisms were delivered. (Secretary, Mrs. L. Sargent.)

HOPE FOREST.

The Branch is in its third year, and on 3rd April made an attempt in showing what members can do. There were some fine exhibits in the pickles and preserves section also among the vegetables. A prize was offered by the President for an article made from sugar bag. The garment which won the prize being a pair of boy's trousers which had been dyed a brown shade with Condy's Crystals, and lined. Invited Branches responed very well. Many of the exhibits were sold and together with afternoon tea for which a charge was made, added to the finances of the Branch.

On 11th May, members attended the McLaren Flat Branch when Mrs. F. Wilson gave an account of a trip to Ceylon. (Secretary, Miss M. DeCaux.)

KALANGADOO.

"The Draft and Adjustment of Bodice Patterns," was explained by Miss Dangerfield at the March meeting, who continued her demonstration of Dressmaking on 3rd April. (Secretary, Miss. W. Dangerfield.)

KOOLUNGA.

Reports on the Mid-North Conference were given at the March meeting.

On the 16th April, Mrs. Perrin gave an account of a visit to Victoria. (Secretary, Mrs. C. Buchanan.)

KYBYBOLITE.

On 23rd March, Mrs. V. Petherick read a paper, "Rock Gardens." (Secretary, Mrs. M. Kekwick.)

LAURA BAY.

Uses of Hessian.

Members met at Mrs. Bowell's residence for the April meeting. Miss R. Blumson (Secretary), read the following paper:—

Numerous useful articles can be made from hessian. A sugar bag can be used for anything small. When buying hessian it is better to pay a little more and get a good quality material so that the appearance of the finished article will not be spoilt. Before commencing to use the hessian it should be well damped and thoroughly ironed. Before attempting to dye the material, be quite sure it is thoroughly wet all over. Wash it several times in very hot water. Make the dye according to directions, place the wet hessian into it and continue to boil for 15 minutes stirring constantly, so that the dye will penetrate evenly. Have plenty of dye to well cover the article, otherwise the material may be streaky when finished. When done, take out and rinse in cold water to which a little salt has been added. Press well with a fairly hot iron while still damp.

There are many different ways of making cushions from hessian. They can have a spray of flowers traced on them and worked in coloured cottons or wool. Another suggestion is to cut out coloured flowers from crettone and button-hole into place with a coloured thread. The edge of cushions can be fringed out or bound with bias binding or material. Yet another method is to crochet an edging in wool or coarse cotton.

There should be two or three thicknesses of material used for mats, otherwise they will not lay flat. Designs can be worked either in coloured threads, wool or have crettone flowers sewn on. Designs worked with a hooked rug needle, are very effective as well as being easily and quickly done. The edge can be bound or fringed or trimmings can be purchased suitable to make the edging.

A cover for a small table in a boy's room or sleep-out can be made very attractive if sprays of flowers or fruit cut from crettone are arranged in each corner and buttonholed around with coloured cottons.

Aprons, peg bags, duster bags and paper tidy can all be made with hessian. Curtains for a boy's room or sleep-out are quite suitable if strips of material are sewn across to form a border at the bottom. Curtains, cushions, bed-cover and table cover all made to match will stand a lot of hard wear and be very easy to wash.

A cover for a mattress will be handy sometimes and is easily made from hessian.

Hessian is quite nice for a deck-chair cover, providing several thicknesses of material are sewn together. Place strips of material 4in. wide down either side and one in the middle.

A shopping bag is better made with wooden handles. Cross-stitch is a quick and easy way of making a design.

To make a fire screen cut a square piece of hessian to fit the fire-place then make a wooden frame and attach hessian to it. A painting would look particularly nice on a fire screen.

MALTEE.

Smocking.

Miss D. Edson read the following paper at the April meeting:—

Hands previously unskilled in the art, can after a little practice, tackle the most intricate looking stitches with ease and confidence.

Children aged two to four years look nice in little frocks smocked at the neck or yolk and a little round the sleeves gives a finishing effect. They can be fashioned from warm materials for winter and early spring wear and, from silk, crepe-de-chine, muslin, linen, etc. for summer.

All work begins from the left working to the right. After having transferred the dots to the material run thread along each side of the dots until the material is all gathered, then fasten threads at each end, leaving the material the correct fulness or width desired. Each line of gathering must have a separate thread and should be started at the right-hand side with a double stitch to hold the knot so that it will not pull through when the thread is drawn up. The evenness of the gathering is also important and the beauty of the work depends upon it.

Outline Stitch.—Work from left to right. Start the thread on the wrong side of material on second pleat of gathering. Bring the needle up in the first pleat on the right side of material. Take one from left to right on top of each pleat, keeping thread above the needle and each stitch directly over the gathering thread. (The same effect is obtained by keeping thread below the needle.)

Single Wave.—The wave proper consists of 4 stitches worked gradually up and 4 down in Outline Stitch. Start thread in second pleat on the right side of material and work to the line above using one, two, three stitches. One on each pleat with the thread below the needle going up. With thread above the needle, take one stitch on the line next to the third, stitch up and work to the line below, using 3 stiches gradually. Then with the thread below the needle, take one stitch next to the last on the line and work again to the line above, using three stiches and repeat. If space permits, use 4 stitches in place of 3. Two, three, or more lines of wave can be worked one above the other.

Double Wave or Diamond Stitch.—Commence the second line by bringing the needle up on the first pleat. Take a stitch on second between second and third lines, keeping the thread above the needle. Now with thread below the needle, take third pleat between second and third lines. Take fourth pleat (thread below needle) on second lines. Take fifth pleat (with thread above needle) on second line and repeat. Start other half of Diamond on third line and work up to meet first half.

Honeycomb Stitch.—This stitch is frequently used on kiddies' dresses and coats, etc. There are several ways of preparing the material, but all ways lead to the same results. The dots may be gathered or not as preferred. Begin work on upper right hand side. Fasten thread so that it will not pull through. Bring needle up through second dot and take first and second dots together, then over once again to first dot, pass needle up back of material to first row and take second and third dots in same way. Down again to second row and take second and third dots there. Down again to second row and take third and fourth dots together, then to the first row and take fourth and fifth dots together. In other words, let the vertical dot run parallel to the one last worked become the first in the succeeding stitch.''

On 1st April, members discussed ''Cake Recipes.'' (Secretary, Miss L. Schwartz.)

MANGALO.

A demonstration of rug making was given by Mrs. A. Whitbread, of Cowell, at the meeting held on 11th March. There was an excellent attendance of members and 15 visitors. The April meeting was held at the homestead of Mrs. A. Turner, when ''Pudding Recipes'' were given by Mesdames Crettenden, Coles, Olsen, Hissey and Turner. (Secretary, Mrs. B. Coles.)

MILANG.

''Hobbies'' was the subject of the meeting held on 19th March. Miss J. Matheson read a paper on ''Knitting'' and members exhibited articles illustrating various patterns. Mrs. Newell spoke on ''Reading,'' and the Secretary, Miss R. Whitfield, contributed a paper on ''Stamp Collecting'' and showed some of the interesting specimens of her collection.

Miss Hassam gave a talk on ''Needlework'' on 16th April, which was attended by 15 members and 7 visitors.

MILLICENT.

Cookery and Flower Exhibition.

A successful flower and cookery exhibition was held on 23rd April, and it is likely that the success achieved will result in the fixture becoming an annual one. A large crowd attended and admired the fine exhibits of flowers and cookery, which were in abundance. In many sections, numerous entries were received, and the judges had no small task in making their decisions. The exhibition was opened by Mrs. H. E. Holzgrefe. Visitors were present from Coonawarra, Kalangadoo, Tantanoola, and Rendelsham Branches. During the afternoon, a pianoforte solo was rendered by Miss Delsie Osborne, and a competition was won by Mrs. Elton. Mesdames A. H. and G. Millhouse judged the cookery section, and Mrs. Alf Fensom, Mrs. S. McArthur, and Miss Alice McArthur judged the flowers. A 25lb. bag of flour, donated by the Golden Crust Self-Raising Flour Company, was won by Mrs. G. H. Bird, of Tantanoola. The awards were as follows:—

FLOWERS.

Gaillardia—Mrs. A. Varcoe 1, Miss D. Osborne 2. Carnations—Miss Bowering 1, Miss D. Osborne 2. Pelargoniums—Miss Bowering 1. Antirrhinums—Miss Bowering 1, Mrs G. W. Altschwager 2. Zinnias—Mrs. G. W. Altschwager 1, Miss I. Fensom 2. Six dahlias—Mrs. A. Varcoe 1, Mrs. E. W. Willshire 2; Miss Bowering special. Cactus dahlia—Mrs. A. Varcoe 1, Mrs. W. H. Shaw 2. Phlox—Miss Bowering 1.

The name of the exhibitor of the second prize could not be ascertained. Six cut flowers—Miss Bowering 1, Mrs. E. J. Mitchell 2. Chrysanthemums—Mrs. J. Elton 1 and 2. Single chrysanthemum—Mrs. G. W. Altschwager 1 and 2. African marigold—Mrs. Major. Cosmos—Captain C. E. Coward, Mrs. G. W. Altschwager 2. Sheaf—Mrs. E. W. Willshire 1, Mrs. G. W. Altschwager 2. Wreath—Miss R. Altschwager 1, Miss Pycroft 2. Bowl of asters—Mrs. G. W. Altschwager 1, Miss D. Osborne 2. Bowl of zinnias—Mrs. G. W. Altschwager 1. Bowl of mixed flowers—Mrs. P. Sullivan 1, Miss Bowering 2. Vase of flowers—Miss D. Osborne 1, Mrs. P. Sullivan 2.

COOKERY.

Dark pound cake—Mrs. W. H. Shaw 1, Mrs. D. M. Day 2. Sultana cake—Mrs. G. H. Bird 1, Mrs. W. H. Shaw 2. Sponge sandwich (girls under 16 years)—Miss Nestor Alleyn 1, Miss Dorothy Alleyn 2. Sponge sandwich—Miss D. Osborne 1 and 2. White scones—Mrs. G. H. Bird 1, Miss Kathleen Ey 2. Date scones—Mrs. D. M. Day 1, Miss Sylvia Thompson 2. Collection of six kinds of pastry—Mrs. W. H. Shaw 1, Mrs. G. Thompson 2. Collection of biscuits—Miss D. Osborne 1 and 2. Lamingtons—Mrs. W. H. Shaw 1, Misses I. and J. Fensom 2. Cream puffs—Mrs. E. J. Mitchell 1, Mrs. V. T. Bateman 2. Queen cakes—Mrs. J. Alleyn 1, Mrs. D. M. Day 2. Coffee cake—Mrs. W. H. Shaw 1, Miss Dorothy Alleyn 2. Pasties—Mrs. G. Thompson 1, Mrs. G. Elton 2. Two pound loaf of white bread—Mrs. H. J. Edgecumbe 1, Miss D. Osborne 2.

Useful Hints.

The March meeting was held on Friday last, when the meeting took the form of a Question Box, Recipes and Opportunity Afternoon. There was a good attendance. Recipes were read, and the following "useful hints" given:—

To blacken tan shoes successfully, wipe them all over with warm water, in which a small piece of washing soda has been dissolved. Allow to dry, then clean with ordinary shoe polish, and the tan will never show through. Always put a small piece of bread in the pan when frying fish. This prevents the fat from spluttering, and also shows by its colour when the fat is ready for the fish to be put in the pan. To make breadcrumbs quickly, cut the soft part from a stale loaf, and tie in a soft muslin bag. Then gently rub it with the hands for a few minutes. The crumbs will be quite fine enough for all requirements. If flower vases become stained, fill them with cold tea leaves, stand for a few minutes, and rinse with warm water.

If 2 tbspns. of milk are added to the bluing water, white clothes will not become marked, but will blue evenly. A tspn. of melted butter added to pancake mixture just before cooking will improve the colour, and also prevent the mixture from sticking to the pan. Before marking new linen, dip the portion to be marked into cold starch, and press it with a warm iron. The ink will not run, and the pen will not catch on the threads, and perhaps make a blot. (Secretary, Miss K. Hutchesson.)

MONARTO SOUTH.

Miss E. Hein presided over an attendance of 20 members at the meeting held on 28th April. Prizes were given to those sending in the most economical recipe, and were won by Miss Hein and the Secretary, Mrs. Liebelt.

MYPONGA.

Pickling and Jointing Meat.

On 14th April members met at Mrs. Lykke's residence, when a paper on kitchen gardening was read.

Miss C. Oldfield read the following paper at the May meeting:—

To prepare the pickling liquids obtain 1½galls. water, 2lbs. coarse salt, ½lb. brown sugar, and 1 good teaspoon saltpetre; place all in a clean bucket, bring to a boil, stirring to dissolve well; boil for 10 minutes; take off fire and stand until cold. Have meat cut in pieces of suitable size for cooking, pack loosely in the brine, place a plate or weight on top to prevent it rising out of the brine; bring to a boil and keep boiling from 3 to 5 minutes; take off fire and stand in a cool place. Be sure to have all meat covered. If the meat is very fat there may be enough fat cooked out to seal the meat, if not, take off what rises, add more heat and pour on top of the brine to seal thoroughly. If it is desired to use a small quantity of meat, lift the fat, take out what is needed, heat fat and pour back over what is left. Meat pickled in this way will keep for weeks. If left in salt for a long time, soak in cold water a while before cooking (say ½ an hour). Pork pickled this way is equally as nice as mutton. The meat should always be pickled when it is quite fresh, the morning after it is killed is best.

Mrs. H. Shepherd gave a demonstration of how to cut up a sheep, and named the different joints. (Secretary, Mrs. M. Bounds.)

O'LOUGHLIN.

Household Hints.

The following hints were given at the April meeting, which was held at Mrs. C. Kloeden's residence:—

Cure for Warts.—Rub warts night and morning with castor oil. *Corn Cure.*—Apply a poultice made of white bread soaked in vinegar to a corn and cover with a piece of lint or oiled silk. Leave on for 12 hours and then renew poultice. *Hair Washing.*—After washing the hair add a little lemon juice to the final rinsing water; this will remove the soap and help to bring out the brightness of the hair. *Bruised Finger.*—For quick relief for a jammed or bruised finger, apply kerosene. *Hard Water.*—If water is hard, put a cup of separated milk in the blue water.

Recipes for Summer Dishes.—Mix together 1 tin salmon, 2 finely chopped spring onions, 2 hard-boiled eggs, salt, pepper, and mayonnaise. Serve in large lettuce leaves.

Queen Pudding.—Half fill a pie dish with stale cake, make a custard and bake until set, then spread with raspberry jam and whipped whites of egg. Bake for a few minutes till brown.

Sago Currants.—Put 1 cup of sago in 3 cups of boiling water, boil for a few minutes, add ½ cup of currants and simmer until sago is cooked. Put out to cool, serve with junket. (Secretary, Mrs. E. Lutz.)

OWEN.

Home Decoration Hints.

The following were given by Mrs. E. Shimmin:—

Staining Floorboards.—Use light oak stain, then varnish.

Doorsteps.—Apply Raw Linseed Oil before staining.

Laying Lino.—Put a thick layer of newspaper over boards. Buy an extra yard to match pattern. Do not tack for 2 months.

Kalsomining.—Have a proper kalsomine brush. Stop up any cracks with plaster of paris and little kalsomine. Follow directions on packet carefully. For a rough wall give 2 thin coats.

Painting.—Never paint from a large tin, because air must not get in. Do not put paint or varnish back into large tin. If covering dark wood with white, give 3 coats of paint. Two thin coats are better than one thick one.

Care of Brushes.—Kalsomine—Wash in cold water and dry. Paint—Soak in kerosene, then dry well. Ezywork—Methylated spirits.

To Paint Bath.—Sandpaper well and give two coats, letting dry thoroughly between each and before using.

Use a frieze to add to or subtract from height of walls. For room brightly lit by sun use light green or grey kalsomine and woodwork in deeper tone. For a dark room use white, cream or buff colour. For a bedroom always choose a quiet pattern of wallpaper or frieze.

To tighten blind, take down and roll tightly. Do not use tacks when putting blind on roller. Special clips are sold for the purpose. Do not leave a sash cord broken, as they are very easily replaced.

Smoking Chimneys.—Chimney may be shut in by trees or part of building. Chimneys should be the highest part of house.

Mrs. W. J. Marshman gave an interesting talk on a recent trip to the Eastern States. The Sponge Cake Competition was won by Miss D. Jeffrey, Miss A. Harkness 2nd, and Mesdames C. Marshman and H. Helps 3rd. (Secretary, Miss M. Lake.)

PARRAKIE.

Trees on the Farm.

The following paper was read by Mrs. G. Hollis at the meeting held on 1st May at Mrs. E. Ross' homestead:—

Do we fully realise the value of planting trees on the farm? Probably most settlers in the Mallee districts, in particular, have seen so much of the Mallee tree and other scrub growth that we do not fully appreciate the asset represented by a number of suitable trees that can be easily grown on the farm.

The two most popular trees suitable for growing here, are the Gum and the Pine. I prefer the gum, Sugar Gums being the most popular and easily grown. The Red Gum, which spreads out and provides more shade, is also grown to a small extent. An easy method to obtain the trees is to purchase a 1s. packet of seed. Then obtain a number of jam tins, cut out the bottoms, and cut up the side, so that the trees can be planted when ready by opening out the tin, and without in any way disturbing the roots. Let the tins into the ground and nearly fill with good soil. Place two or three seeds in each, then lightly cover these with soil. Next cut open a bran bag and place over tins. Keep the bag well watered until the young trees show through the soil.

For a few days, until the plants are stronger, keep them protected from wind. The best time to plant seeds is during August and September, and then the trees will be ready to plant out the following spring. They will grow almost anywhere in this district.

The first summer is a vital one for young trees. If they are watered, absolutely without fail once per week, at the rate of at least two gallons per tree, right through summer, no further attention is required, and one should lose very few. A number of fine trees around a homestead is very pleasing to the eye, compared with a bare appearance without trees. This aspect, of course, must add to the value of any property. After about 15 years, the trees can be topped, when they will branch out afresh and provide much valuable timber.

On 19th May a Social Afternoon was held; 17 members and 17 visitors attended, including nine members of the Wilkawatt Branch. (Secretary, Miss J. Halliday.)

PENOLA.

Thirty-two members and seven visitors attended the meeting held on 5th May. A competition for Dark Pound Cake was won by Miss J. Oswald, 2nd Mrs. W. Clifford, 3rd Mrs. T. Marcus. Dr. Oaten gave an address, "The Psychology of a Child's Mind." (Secretary, Miss A. Marks.)

PINBONG.

Miss J. Kammermann gave an instructive demonstration of Fancy Work at the March meeting, which was held at the residence of Mrs. H. Johnson. On the 19th April a meeting was held at Mrs. N. George's homestead, when a paper, "Cold Meat and Its Uses," was contributed by Mrs. H. Johnson. (Secretary, Miss D. Scholz.)

PINNAROO.

Mrs. Ahrens read a paper, "Bread and Its Uses," and gave a number of useful recipes at the meeting held on 2nd April. (Secretary, Mrs. M. Wirth.)

RENDELSHAM.

On the 24th March the members discussed the varying uses to which hessian could be put and the articles that could be made with this material. Papers on the subject, "Laundering," were read at the meeting held on 7th April. (Secretary, Mrs. Z. Bignell.)

SADDLEWORTH.

Dahlia Show.

A very successful exhibition was held in Saddleworth on 13th April. There was an excellent display of flowers, the three long tables and the stage were packed with magnificent blooms, of which dahlias were the outstanding variety. This exhibition, which was first held in a small way a few years ago, has kindled the enthusiasm of garden lovers to such an extent that the exhibition was one of which the town may well be proud, and which compares very favourably with similar exhibitions held in other parts of the State.

Amongst the dahlias, the Decoratives were the outstanding variety staged, and these included some magnificent blooms of even type. The champion bloom of the show was exhibited by Miss Townsend. This was a well-formed Decorative of the Jane Cowl variety. The vases and bowls sections were a feature of the show and made a magnificent display. Competition in most classes was very keen, and the judges (Mr. and Mrs. H. J. Weckert) had a difficult task in making the awards.

On 4th May, papers read at the Wasleys Conference were discussed. (Secretary, Miss G. Frost.)

SNOWTOWN.

Exhibition of Flowers and Handicrafts.

The above Branch held its first Exhibition on Thursday, 20th April. The Show resulted in a wonderful display of Women's work in Handicrafts, Cooking, Preserving, and Floriculture. The collection of fancy work staged would compare favourably with anything seen in Adelaide. The Clare and Koolunga

Branches showed keen interest and displayed in various sections. In fact, the Snowtown Committee, including Mesdames A. R. Hocking (President), A. Andrews (Vice-President), T. N. Jenkins (Secretary), G. T. Freebairn, A. E. Michael and G. E. A. Dolling in their most sanguine moments never visualized anything approaching the number of entries and quality of work on exhibition.

Mr. F. C. Richards (Assistant Secretary of Agricultural Bureau) opened the Exhibition and complimented members on the progress made in the three years which the Snowtown Branch has to its credit.

PRIZE LIST.

Flowers (Judge, Mrs. Catford).—Vase of Cosmos: Mrs. R. A. Perry; Bowl of Mixed Flowers for Table Decoration: Miss Irene Davidson; Vase of Mixed Flowers: Mrs. Fisk; Vase of Zinnias: Mrs. Van Tenac; Zinnias, 3 Cuts: Mrs. W. Grigg; Bowl of Mixed Chrysanthemums: Mrs. P. H. Wheaton; Champion Chrysanthemums: Mrs. Whitehorn; Single Chrysanthemums: Mrs. Wheaton; Bowl of Mixed Dahlias: Mrs. Whitehorn; Vase Dahlias, suitable for Table Decoration: Mrs. Fisk; Champion Dahlia: Mrs. Lowry; Floating Bowl: Mrs. D. H. Baker; Window Box: Mrs. Lee; Three Rosebuds: Mrs. Michael; Vase of Roses: Mrs. Pengilly; Unenumerated Flowers: Mrs. Wheaton; Posy: Mrs. Fisk.

Preserves and Jams.—Collection of Jams, 4 varieties. Mrs. A. E. Michael; Special: Mrs. A. V. Walkington; Collection of Pickles: Miss M. Slattery; Collection of Preserves: Miss M. Slattery; Special: Mrs. J. E. Pridham; Dish Scalded Cream: Mrs. Wheaton; Tomato Sauce: Miss M. Slattery.

Cooking (Judge, Mrs. S. Perrin).—Sultana Cake: Mrs. Wheaton; Walnut Cake: Mrs. Jensen; Sponge Cake: Mrs. Jensen; Butter Sponge: Mrs. McDonald; Collection Biscuits: Miss Hunter, Miss Shiedlow; Fancy Cakes: Mrs. N. B. McDonald; Scones: Miss E. Cronin; Savouries: Mrs. Pellew; Plate Sandwiches: Mrs. Hocking; Collection Fancy Work: Mrs. A. W. Bieske, Mrs. Irwin; Special prize: Miss D. Hancock; Collection Knitting: Mrs. McKendrick; Pen Painting: Mrs. B. Thomas; Oil Painting: Mrs. Pellew.

Members of the Snowtown Bureau donated a Special Prize to the members of the Koolunga Branch for a very fine display of Fancy Work. (Secretary, Mrs. T. Jenkins.)

STRATHALBYN.

Nineteen members attended the April meeting, when an excellent paper, "Music in the Home," was presented by Mrs. Sykes. (Secretary, Mrs. V. Hudd.)

WARCOWIE.

Members met at the residence of Mrs. A. Crossman for the March meeting, which took the form of a "Question Box."

Cooking Competition.

In the presence of a record attendance of members and visitors—76—the first display of handicrafts and cooking competition was held. On 17th April the Exhibition was opened by Mrs. McPherson of Willippa Station. Matron Gurry of the Hawker Hospital, gave a demonstration on First Aid. The cooking exhibits were judged by Mesdames Clark, Graham and McPherson, who made the following awards:—Bread, Home-Made: Mrs. Wheadon; Yeast Buns: Mrs. R. Jarvis; Yeast Cake: Mrs. R. Jarvis; Sponge Cake, Dark: Mrs. Shute; Sponge Cake, Light: Mrs. Wheadon; Cream Sponge, Made with Cream: Mrs. A. Crossman; Cream Puffs: Mrs. Hilder; Sultana Cake: Mrs. Wheadon; Collection Puff Pastry: Mrs. Avery; Collection Biscuit, Eggless: Mrs. R. Jarvis; Birthday Cake, Plain Iced: Mrs. Wheadon; Birthday Cake, Fancy Iced: Mrs. R. Jarvis; Chutney Pickles, Relish: Mrs. Wheadon; Sauce, Tomato: Mrs. A. Crossman; Collection Home-Grown Vegetables: Mrs. A. Crossman. (Secretary, Mrs. A. Avery.)

WARRAMBOO.

Miss J. P. Patterson had charge of the March meeting, which was attended by 15 members. She gave numerous recipes for Scone Making," and a competition which followed resulted in Mrs. F. Chilman being awarded first prize, Mrs. N. Steer second, and Mrs. G. Kane third.

On 23rd April a social and pasty supper was held. A competition for three Cornish pasties was won by Mrs. J. Mitchell and Mrs. J. Sampson second. In the single girls' section Misses M. Sampson and C. Chilman were the prize-winners. (Secretary, Miss E. Steer.)

WASLEYS.

Twenty-five members attended the meeting held on 8th April to hear Mrs. V. Allen give a talk on New Zealand. (Secretary, Miss K. Harding.)

WILKAWATT.

A social afternoon arranged by Miss D. Pritchard was held on 16th March and was attended by 15 members and 35 visitors; delegates being present from Parrakie and Smithville.

Mrs. G. Oram was responsible for the April meeting, which took the form of a display of Flowers. She also read a paper on "Tomato Diseases." There was an attendance of 30 members and visitors. (Secretary, Mrs. L. Sumsion.)

WILLOWIE.

At the meeting held on 6th April, which was attended by 24 members and visitors, a paper on "Needlework" was read by Mrs. Hughes. The Secretary (Mrs. P. Foulis) acknowledged the receipt of magazines from the Clare Branch. Mrs. C. Michael spoke on "Knitting" and the Secretary on "Woollen Rugs."

Washing.

Mrs. S. McCallum read the following paper at the May meeting:—People living in the towns may be able to employ a woman to do the washing, but it is almost impossible in the country, so we have to try and find the best methods at our disposal.

If a room is available in which to do the washing it is a great help. I sort out the clothes on Saturday afternoon, cut up soap ready for boiling in copper, and also have wood ready, this saves a lot of time on Monday morning. In sorting out the clothes, put anything stained on one side, as these must be removed first. Perhaps blood stains are the most common, and the best way is to soak the article as soon as possible in cold water, to which has been added a large pinch of washing soda. A word of warning:—Some time ago I soaked a large meat bag in an aluminium preserving pan. In the morning the pan was black. This was caused by the soda. I at once put some rhubarb in the pan with plenty of water and boiled it for a time, and most of the black was removed. I always put handkerchiefs into cold water first, and when colds are bad I add a handful of salt, as it makes them much easier to wash. *Grease Stains.*—If the stain is very large first wash the garment in petrol and then in hot water. I have used some of the prepared washing tablets but had to give up doing so because they made my hands sore. Soap Extracts are very good. I do not follow the instructions about putting clothes in copper dry and into cold water, then boil 20 minutes. This would be all right for a small, clean wash, but one must get the worst of the dirt out before putting the clothes into the copper, otherwise the water would become too dirty. I add the extract to the water in copper and also to the tub, in which I have a washer to work the clothes. I usually make my own soap.

Woollens must be washed in luke warm Lux water, and be well shaken before hanging up. A clothes line on the verandah is a great help, because on wet days any article that would spoil by remaining wet could be hung up under cover. Mrs. H. Bartlett spoke on "Pastry Making."

WILMINGTON.

With an excellent attendance of 43 members and visitors, Mrs. Pengilly presided at the April meeting, when Mr. Gooden of Clarkson Ltd., gave an address and demonstration of "Interior Decoration."

On 13th May members enjoyed an afternoon of community singing. (Secretary, Mrs. L. Cole.)

WIRRABARA.

Wallpapers.

The following extracts are taken from an address given by Mr. Gooden of Clarkson Ltd., at a meeting held on 8th April:—

Wallpaper has generally been accepted as an article that does not require any special notice, since its merits are self-evident. Consequently, very little has been written about it. Nor has it been generally known that some of the greatest minds of the past two centuries have been devoted to its production. Wallpapers are designed by successful artists, and their choice of colour and design may be followed safely in selecting the colours for other items of furnishings. Wallpapers add artistic dignity to the walls, and eliminate any possible feeling of cold formality. No other single item of interior decoration compares with wallpaper in the decorative value it gives for the money spent. Whether the preference be for something very quiet and restrained, or something modern and colourful, the desired effect can be secured by the use of wallpaper.

Up to the 18th Century, wallpaper was made in sheets and nailed to the walls, but by the use of machinery at this time they were replaced by rolls. In 1850 the output of English Wallpapers was 5½ million rolls, which had increased in 1875 to 32 million rolls; while in the last century the amount of wallpaper sold in England alone was 70 million rolls. But in a changing world, other styles of wall treatment have been introduced, such as plain and stipple Kalsomines and Paints, and with the desire for something new and material less difficult to apply, the result is that more householders who cannot hang wallpapers are now doing their own work. A section of the Trade also prefers Kalsomine and Stipple work for the same reason; although it is interesting to know that this particular section say that the Stipple effect in wallpapers is softer and more refined in character, and at less cost, than can be achieved by hand. In fact, if one considers *value rather than mere cost*, wallpaper is undoubtedly the least expensive of all wall decorations.

Wallpaper is condemned by many because it has been used merely to cover up cracks in the walls, and the purchaser of the house, in carrying out alterations to the rooms, finds this to be the case. In fact, it is continually stated in the Wallpaper Showroom that because such-and-such a wall is so rough *"it has to be papered,"* and it is further stated that it is a shame to paper a nice smooth wall.

Wallpaper and Hygiene.—This is a subject round which much controversy has raged, and as is usual with such matters people are to be found holding views differing widely from one another. Wallpaper, being porous, in no way interferes with ventilation; nor do we get condensation of moisture on a wallpaper as we do on an imporous surface, such as paint, and it may not be generally known that this condensation of moisture offers an ideal breeding ground for bacteria.

It is significant that during the past few years many of the members of the medical profession have decorated portion of their homes with wallpaper.

Wallpapers and Newly-Plastered Walls.—An interesting feature of interior decoration is the fact that hitherto new walls would have to dry thoroughly before decoration could be carried out, but now by the use of *Porax* (a liquid applied to the new plaster with a brush) the walls can be decorated with wallpapers. Several homes have been successfully treated by this method.

The average roll of wallpaper is 12yds. long and 21in. wide, and covers an area of 60 square feet; and prices range from 8d. roll and upwards. The average quantity is 9 to 10 rolls per room; and the price for hanging is from 2s. to 2s. 6d. per roll. Many of the wallpapers are semi-trimmed. (Secretary, Mrs. E. Harding.)

TESTED HONEY RECIPES.

For the Australian Housewife.

To obtain best results from the use of honey, cakes that contain butter and honey (excepting fruit cake) retain their freshness for a longer period when sugar and honey are used than when honey alone is used. It has been found that sponge cakes made with honey and no butter retain their freshness much longer than when made with sugar. There is an added richness about the flavour of a sweet or cake which has honey as an ingredient.

As far as possible, honey of about the same colour and density should be procured, with as little variation of flavour as possible.

Quantities must be accurately measured or weighed where stipulated, guessing is unsatisfactory.

When substituting honey for sugar in cakes, due allowance must be made for the higher moisture content of honey over sugar — which means that less liquid is required in the mixture.

A level tablespoon of honey weighs one ounce, but as tablespoons vary in size, they should be tested accurately, so that the exact amount of honey according to recipe is used.

Honey-prepared mixes are slightly more sensitive to heat, so that a slower oven is required in cooking. This is important.

Fruit Cake (Dark, Rich, Moist).

1lb. plain flour, ¼lb. self-raising flour, ½ grated nutmeg, ¼ teaspoon salt, 1 teaspoon cinnamon, ½ teaspoon spice, 8 eggs, 1lb. butter, 1lb. honey (mild candied preferred), 1½lbs. sultanas, ¾lb. raisins, ¼lb. currants, ¼lb. dates, ¼lb. candied peel, 2 tablespoons brandy, ¼ teaspoon soda stirred in one tablespoon of boiling water, 2 tablespoons blanched almonds.

Method.—Cream honey and butter; add eggs one at a time, then some flour and some fruit, then brandy, lastly soda in boiling water. Put into greased tin lined with paper, and bake four to five hours. Hot oven when it goes in. Do not open oven door for 20 minutes, then reduce the heat slightly. Reduce heat again after cake has been in one hour. Very slow oven for the rest of the time.

Honey Sponge.

3 eggs, 1 scant teacup honey, 1 teacup self-raising flour, pinch of salt, 2 dessertspoons cold water.

Method.—Beat whites of 2 eggs with honey till stiff; beat yolks with remaining egg. Gently stir into first mixture. Fold in flour sifted with salt, and lightly mix in water. Bake in well-greased sandwich tins in moderate oven.

Filling.—2 tablespoons each butter and honey, vanilla, beaten to a cream.

Nut Loaf.

1 breakfastcup flour, ½ cup honey, ½ cup chopped walnuts, ½ cup sultanas, ¼ cup milk, 1 teaspoon baking powder, 1 egg, 1 tablespoon butter, pinch of salt.

Method.—Cream butter and honey, add egg; beat. Add milk, flour sifted with salt and baking powder, then walnuts and sultanas. Bake in a moderate oven.

Honey Fruit Drops.

1 cup butter, ½ cup honey, 1 egg, cup of chopped dates, 2 cups flour, pinch of salt, 1 cup seeded raisins, ½ teaspoon cinnamon, ⅔ cup chopped walnuts.

Method.—Cream butter and honey, add egg; beat. Add dates, raisins, cinnamon, nuts and flour. Drop in teaspoonfuls on greased pan. Makes about 3 dozen.

Honey Lemon Cheese.

3 or 4 eggs, ½lb. sugar, ½lb. honey, ¼lb. butter, juice of 3 lemons, and grated rind of 2 lemons.

Method.—Beat eggs well. Put all ingredients in double saucepan or jug. Cook in saucepan of water until thick, stirring frequently.

Lamingtons.

3 eggs, 1 teacup self-raising flour, scant teacup honey, pinch of salt, 2 dessertspoons cold water.

Method.—Beat whites of two eggs with honey till stiff. Beat yolks well with remaining egg. Mix gently into whites. Fold in flour sifted with salt. Mix in water lightly. Bake in well-greased baking dish in moderate oven.

Icing.—Whites of 2 eggs, beaten till stiff. Fold in 1 scant teacup of icing sugar sifted with 3 teaspoons of cocoa. Cut cake into squares, raise square on carving fork, and coat with icing; roll in coconut. (Will keep moist for long time.)

Honey Rolls.

1 tablespoon butter, 1½ scant tablespoons honey, 1 egg, 2 teacups self-raising flour, pinch of salt, ⅓ cup milk.

Method.—Cream butter and honey, add egg; beat. Then add milk, lastly flour sifted with salt. Roll out on floured board to ½in. thickness. Cut out with tumbler and fold half over. Place in greased baking dish and bake in moderate oven.

Honey Sponge Roll.

3 eggs, ½ cup sugar, 1 tablespoon honey, ½ cup arrowroot, 2 heaped teaspoons flour, 1 teaspoon cream of tartar, ½ teaspoon soda, 1 teaspoon spice, ½ teaspoon cinnamon.

Method.—Beat eggs and sugar for fifteen minutes, add arrowroot, flour and other dry ingredients which have been sifted twice, then add honey. Pour in a well-greased tin and bake twenty minutes in a moderate oven.

Sultana Cake.

4ozs. butter, 2½ozs. sugar, 2 level tablespoons honey, ¼ cup milk, 2 eggs, 8ozs. self-raising flour, 3ozs. sultanas.

Method.—Cream butter, sugar and honey; add eggs one at a time and beat well. Add milk and sultanas, then flour sifted with salt. Bake in greased cake tin in moderate oven.

Ginger Bread.

½ cup butter, ½ cup sugar, 1 egg, 1 cup honey, 2½ cups sifted flour, 1½ teaspoons soda, 1 teaspoon cinnamon, 1 teaspoon ginger, ½ teaspoon cloves, ½ teaspoon salt, 1 cup hot water.

Method.—Cream butter and sugar; add beaten egg, honey, and then dry ingredients sifted together. Add water last. Beat until smooth. The batter is thin, but it makes a fine cake. Bake in well-greased baking pan in moderate oven.

Cornflake Crisps.

Small ½ cup sugar, 1 cup coconut, 1 cup rolled oats, 1 cup cornflakes. Mix all together. Melt ¼lb. butter and dessertspoon honey. Add to ingredients. The mixture seems soft. Lift it straight out into greased baking tin. Press it into shape of tin. (Size 10in. by 7in. takes this quantity nicely.) Bake in slow oven until golden brown. Cut into squares while hot, but do not remove from tin until cold.

Rice Bubble Nutties.

1 cup rice bubbles, 1 cup rolled oats, ¾ cup flour, ½ cup coconut, pinch of salt, ½ cup sugar. Mix together. Add ½ cup melted butter, 1 dessertspoon honey, lastly ½ teaspoon soda dissolved in 2 scant tablespoons boiling water. Drop in spoonfuls on greased tray, leaving space to spread well. Bake in slow oven and leave on tray till cold.

Cornflake Macaroons.

2 egg whites, 1 scant cup sugar, 1 level tablespoon honey, 2 cups cornflakes, ½ cup chopped walnuts, 1 cup coconut, ½ teaspoon vanilla.

Method.—Beat egg whites until stiff, fold in sugar carefully, then honey gradually; fold in cornflakes, nuts and coconut, add vanilla. Drop in spoonfuls on to well-greased baking tin. Bake in slow oven.

Ginger Sponge.

¼ cup butter, ¼ cup sugar, 1 egg, ½ cup honey, 1¼ cups flour, ¾ teaspoon soda, ½ teaspoon cinnamon, ½ teaspoon ginger, ¼ teaspoon cloves, ¼ teaspoon salt, ½ cup hot water.

Method.—Cream butter and sugar; add beaten egg and honey, then dry ingredients sifted together. Add hot water last. Beat until smooth. Pour into well-greased sandwich tins. Bake in moderate oven.

Filling.—2 tablespoons butter, 2 tablespoons honey, essence vanilla, beaten into a cream.

Patty Cakes.

2ozs. butter, 1 heaped tablespoon sugar, 1 level tablespoon honey, 1 egg, 2 tablespoons milk, 4ozs. self-raising flour, pinch of salt.

Method.—Cream butter, sugar and honey, add egg; beat. Then add milk, lastly flour sifted with salt. Drop teaspoonfuls in patty containers. Makes,one dozen.

Honey Plum Pudding.

½lb. butter, ½lb. honey, ¾lb. raisins, ¾lb. sultanas, 4ozs. mixed candied peel, 7 ozs. breadcrumbs, 5ozs. flour, 2½ozs. almonds (chopped fine), half a nutmeg (grated), 1 saltspoon each of ground ginger, allspice and cinnamon, 1 teaspoon salt, 1 teaspoon baking powder, 4 eggs, ⅓ cup milk.

Method.—Beat butter and honey to a cream; add eggs one at a time, then dry ingredients and baking powder. Steam for seven hours, or put in two moulds and steam four hours each.

Foundation Recipe for Steam Pudding (Devon, Date and Chocolate Pudding).

Ingredients.—6ozs. self-raising flour, 2½ ozs. butter, 2 small (or 1 large) eggs, small ¼ cup milk, 3 level tablespoons (3ozs. honey, few drops essence.

Method.—Beat butter and honey to a cream, add eggs; beat well. Add milk and essence, then flour. Steam for 1½ hours.

Devon Pudding.—By addition of 3 tablespoons sultanas and 1 tablespoon chopped almonds.

Date Pudding.—By addition of ¼lb. stoned dates and 1 tablespoon chopped walnuts.

Chocolate Pudding.—By addition of 1 tablespoon cocoa and half a teaspoon of vanilla or chocolate powder.

Rice Pudding.

3ozs. rice, 1 level tablespoon honey, ½ pint water, 1 good pint milk, 2 eggs, pinch salt, nutmeg, 1 teaspoon butter.

Method.—Wash rice; simmer it gently in the water till it is all absorbed. Stir it now and then. Add the milk. Bring to a simmer and cook gently for ¼ hour. Allow to cool two minutes. Beat eggs and honey. Butter pie dish. Pour rice and milk in; add eggs and honey and mix gently. Put 4 small pieces of butter on, grate nutmeg on top, and cook gently (standing in dish of cold water) for 40 to 50 minutes, or till set.

Tapioca or Sago Puddings.

Use same ingredients and method as for rice pudding, except that the tapioca or sago is soaked in ½ pint of cold water until water is absorbed.

Bread and Butter Custard.

2 eggs, 1 pint of milk, dessertspoon butter, essence of lemon, 2 tablespoons sultanas, 1 dessertspoon honey, thin slices bread.

Method.—Butter bread, cut into squares; sprinkle with fruit. Beat eggs and honey, add milk; pour over bread. Bake gently standing in dish of water till set—about 30 to 40 minutes.

Baked Custard.

1½ cups milk, scant tablespoon honey, 2 eggs, essence of vanilla.

Method.—Beat eggs and honey; add milk and vanilla. Pour into buttered pie dish and cook gently, standing in dish of water till set.

Baked and Stewed Apples.

For Baking.—Peel and core apples, place in baking dish; fill centres with honey, 1 clove and piece of butter on top. Make syrup with tablespoon honey and ½ cup hot water. Pour into baking dish and baste occasionally.

For Stewing.—Peel and cut as usual. Use honey and water to sweeten, add piece of lemon rind and few cloves. Cook gently.

Honey and Stewed Fruits.

Rhubarb and apple, rhubarb, prunes, plums, peaches, apricots, pears, nectarines, cherries, quinces are all delicious when stewed in the usual way, using honey instead of sugar (same proportion).

Apple Windsor Pudding.

4ozs. butter, 2ozs. sugar, 2 level tablespoons honey, ¼ cup milk, 8ozs. self-raising flour, 2 eggs, stewed apples with honey.

Method.—Place apples in botton of pie dish; beat butter, sugar and honey to cream. Add eggs one at a time and beat well. Add milk, and lastly flour, sifted with a pinch of salt. Cover apples with cake mixture. Bake in moderate oven.

French Pan Cakes.

2 eggs, 2ozs. butter, 1½ozs. sugar, dessertspoon honey, 2 good ozs. flour, ½ pint of fresh milk.

Method.—Beat butter and honey to a cream. Stir in sugar and flour which has been slightly warmed. Add well-beaten eggs, and lastly milk. Keep beating the mixture for a few minutes. Pour into buttered baking dish. Bake in moderate oven for about 20 minutes, and serve immediately. May be made with all honey if desired.

Honey Fruit Cake.

1 cup honey, ½lb. butter, 5 eggs, 2½ cups plain flour, 2 teaspoons baking powder, 1 cup dates, 4 tablespoons allspice, 2 cups chopped raw peanuts, 1 cup chopped almonds, 2 cups currants, 2 cups seedless raisins, ¼lb. mixed peel, ¼lb. crystallized pineapple, ½lb. candied cherries.

Sift flour and measure. Divide flour into two equal parts. To one add baking powder and allspice, and sift twice more. Cream butter well. Add honey. Add well-beaten egg yolks. Add sifted dry ingredients gradually. Fold in stiffly-beaten egg whites. Roll nuts and fruits (except cherries and pineapple) in remaining flour. Add to dough mixture. Add cherries and pineapple. Bake in slow oven 2½ hours or more.

(This cake is specially recommended, having won a number of competitions at shows in various parts of Australia.)

Honey Layer Cake.

⅔ cup of water, 1 cup honey, 3 eggs beaten, ½ cup milk. Cream the honey and butter together then add the eggs and milk. Then add 2 cups flour containing 1½ teaspoons baking powder previously stirred in. Then stir in flour to make a stiff batter. Bake in jelly-tins. When the cakes are cold, take finely flavoured candied honey, and after creaming it spread between layers.

Honey Short-Cake.

3 cups flour, 2 teaspoons baking powder, 1 teaspoon salt, ½ cup shortening, 1½ cups sweet milk. Roll quickly and bake in hot oven. When done split the cake and spread

the lower half thinly with butter, and the upper half with ½lb. of the best-flavoured honey. (Candied honey is preferred. If too hard to spread well it should be slightly warmed or creamed with knife). Let it stand a few minutes and the honey will melt gradually, and the flavour will permeate all through the cake; to be eaten with milk.

Steamed Honey Pudding.

2ozs. butter, 2ozs. sugar, 1 good tablespoon honey, 1 egg, 2 tablespoons milk, 4 ozs. plain flour, ½ teaspoon carbonate of soda. Cream butter and sugar; add honey, and cream well; add beaten egg, then milk, lastly the well-sifted flour and soda. Pour into greased mould, cover with lid or greased paper. Steam 1½ hours. Turn on to hot dish and serve with honey sauce.

Honey Sauce.

1 tablespoon arrowroot, 2 dessertspoons butter, ½ cup honey, 12 cups water. Blend the arrowroot with a little cold water. Boil the remainder of water with honey and butter. Pour on to the arrowroot, return to the saucepan. Stir till it boils, thickens, and is quite clear. Serve with steamed pudding.

Butter Honey Cake.

1 pint flour, 1 tablespoon butter, 1 teaspoon soda, 2 teaspoons cream of tartar, honey to make a thick cream. Spread about an inch thick, and bake in hot oven.

Honey Tea Cakes.

1lb. flour, 2 tablespoons butter, a little salt, 2 large tablespoons baking powder, 2 tablespoons honey, 2 eggs, a little milk.

Method.—Beat the eggs thoroughly and add the other ingredients with sufficient milk to make a light dough. Drop with a spoon on to a greased baking tin or bake in patty tins for 10 to 15 minutes in a quick oven.

Chocolate Cake.

Ingredients.—½ cup butter, 1 cup of sugar, 1 cup honey, ¾ cup cocoa, 3 teaspoons baking powder, ½ cup hot water, 1 cup milk, 4 eggs, 2½ cups cake flour.

Method.—Cream butter, sugar, honey and cocoa. Add hot water, beat well, then add well beaten eggs, flour and baking powder and milk. Bake in moderate oven (350 degrees) for 40 to 45 minutes.

Honey Caramels.

1 cup of liquid honey of best flavour, 1 cup granulated sugar, 3 tablespoons sweet cream or milk. Boil until it hardens when dropped into cold water, but not too brittle—just so as it will form into a soft ball when taken in the fingers. Pour into a greased dish, stirring in a teaspoon extract of vanilla just before taking off. Let it be ½ or ¾ inch deep in the dish, and as it cools cut into squares and wrap each square in paraffin paper, such as grocers wrap butter in. To make chocolate caramels, add to the foregoing 1 tablespoon melted chocolate just before taking off the stove, stirring it in well.

Honey Cookies.

Blend ½ cup honey, 1 teaspoon butter, 1 egg beaten light, ½ teaspoon baking powder, pinch salt, flour to make a stiff dough. Drop in buttered tins. Bake in slow oven.

Honey Biscuits.

Ingredients.—1lb. honey, ¼lb. butter, 1lb. flour, ¼lb. ground almonds, ¼oz. carbonate of soda, pinch of salt, pinch of ground cloves, grated rind of ½ lemon.

Method.—Sift the flour, salt, carbonate of of soda and cloves in a basin. Add the ground almonds and grated lemon rind. Melt the butter and honey together and add them to the dry ingredients. Mix together thoroughly. Then cover the basin and let the mixture stand all night. Next day turn it on to a floured board, and roll the mixture out half an inch in thickness, and cut out. Brush tops with white of egg, sprinkle with ground almonds, and bake on greased tins in a moderate oven for about 15 minutes or till the cakes are crisp, and a pale brown colour.

Honey Lemon Pie.

Ingredients.—1 cup of honey, yolk of three eggs beaten light, one tablespoon of flour, juice and fresh grated rind of lemon, 1 tablespoon melted butter.

Method.—Mix thoroughly in the order given, then add 1¼ cups of rich milk. Pour into pie plate, line with a good crust, pricked to prevent air blisters, and bake until set. Cover with a meringue of the white of eggs beaten with 3 tablespoons of honey and a few drops of lemon juice and brown lightly.

Oat Honey-Cookies.

To make oat-cookies take 4ozs. rolled oats, 6ozs. flour, ½ teaspoon of carbonate of soda, ¼ teaspoon each of ground cinnamon, ground cloves, grated nutmeg and salt, 4ozs. raisins, 1 teacup honey, 3ozs. butter (melted) and one egg.

Method.—Sift the flour with the salt, soda and spices. Add the rolled oats and raisins, then the honey and melted butter. Mix well so that the last two ingredients may be well worked in. Add the egg well beaten and stir for 5 minutes. Drop small portions on cold oven slides, and bake at 350 deg. for about 15 minutes. These cookies improve with keeping.

Peanut Honey Candy.

Take 1 cup butter, 2 cups honey, 2 cups sugar, 1 cup boiling water, ¼ teaspoonful cream of tartar, ½ teaspoon glycerine, a tiny dash of soda. Boil ten minutes to a soft ball, and set in cool place. When it has cooled slightly, stir in one or two tablespoons of peanut butter, or to suit taste; keep stirring till creamy; then pour into buttered pans; mark in squares.

Marshmallow Cream.

Ingredients.—¼ cup honey, 1 teaspoon gelatine, ½ cup cold water, 1 teaspoon lemon extract, ½ cup boiling water, whites of two eggs, 1 teaspoon vanilla.

Method.—Dissolve gelatine in the usual way, heating it over a tea-kettle until thoroughly dissolved. Cool, but do not chill; stir in the honey, and add to the whites of the eggs beaten very light, a few spoonsful at a time, beaten constantly. Divide into two parts; to one add a colour and flavour with vanilla, about 1 teaspoon; to the other add 1 teaspoon lemon extract. Mould in layers, adding nuts to one part and marashino cherries to the other. Serve with or without cream.

Honey Fondant.

2 cups granulated sugar, ⅓ cup honey, ½ cup water. Mix, put over fire, and stir only until the sugar is dissolved. Boil carefully until able to shape a very soft ball when tested in cold water (about 238 deg. F.). Do not stir while boiling, and do not scrape off sugar which adheres to the side of the pan. When done, pour into greased platter and partially cool. Beat and stir with a wooden spoon until it begins to crumble, and then knead with the hands like dough. Pack in a bowl, cover with a cloth, and set aside until needed. When ready for use the bowl of fondant may be set in hot water until soft enough to handle. Any flavouring may be added when shaping into candies. The honey flavour alone is delicious when the fondant is used for cakes.

The use of honey in fondant obviates the necessity of using cream of tartar. The slight acidity of the honey keeps it from graining too soon. If the fondant is boiled too hard, pull until white; the result will be a fine taffy.

Honey Toffee.

Honey makes a fine toffee. Boil honey until it hardens when dropped into cold water. Pull until it become white. A pound requires 20 minutes boiling and stirring. Great care must be exercised not to burn the honey.

Honey Candy.

3 heaped teaspoons butter, 1 quart honey, 2 tablespoons vinegar. Boil until the mixture will harden when dropped into cold water. Stir in ½ teaspoon baking soda, 2 teaspoons lemon extract. Pour into buttered tin to cool. Mark into squares, and when cold break apart.

HONEY IN MEDICINE.

For Asthma.

Mix 1oz. castor oil with 4ozs. honey. Take one tablespoon night and morning.

For Feverish Cough.

Mix 1 fluid oz. each of honey, olive oil, lemon juice, and sweet spirits of nitre. To be taken several times a day in half-fluid drachm doses.

For Obstinate Cough.

Mix equal quantities of honey, linseed oil, and whisky. Take 1 tablespoon three of four times a day.

Bronchial Cough.

Equal parts of honey and lemon juice give immediate relief.

Nearly all cough mixtures contain honey —Ask yourself why!

A Good Tonic.

Equal parts honey, cod liver oil, juice of lemon, and juice of orange; mix well and take three times a day.

Honey is a mild laxative, and should be regularly fed to children, particularly when fruit is scarce.

Honey Paste for Chapped Hands.

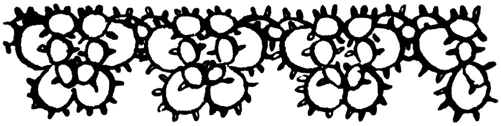
White of 1 egg, 1 teaspoon glycerine, 1oz. honey, and sufficient barley flour to make a paste.

Honey is a prime ingredient of the very best cosmetics, for its action on the skin is always agreeable.

Honey for Irritated Throat.

Take 2 tablespoons each of honey and glycerine, 1 tablespoon lemon juice with a dash of ginger. Keep the mixture warm and use a little as needed. A teaspoon of heated honey will often quickly stop a cough, and seems especially effective at night.

The Art of Tatting.



[By Sylvie A. Dahlenburg
(Sheaoak Log).]

To those unacquainted with the method of tatting, the quick, deft movements of a skilled worker may appear to be very complicated, but it is realy quite simple, even more so than crochet, as there are only two stitches to be learnt.

The only materials required for tatting are a shuttle, a fine crochet hook and cotton to suit the design being worked. The thread used in tatting is a very important factor in the appearance of well-finished work. For best results use the best thread. If using silk, it will be found that it is easier to tie a knot if the thread is moistened, the ends being cut off later, thus reducing the strain of the work on the knot.

Shuttles not more than 2½in. long are the best to use. To fill the shuttle pass the end of the thread through the hole in the centre, tie firmly and cut off the loose end. Wind the thread around the block by pressing the thread through the points. Wind firmly, but do not allow the thread to project beyond the edges of the shuttle as this causes the points to open.

The stitches are composed of the first half stitch and the second half stitch. These are called "double stitch." Holding the shuttle lightly between the thumb and first and second fingers of the right hand, and having the thread coming from the right side of it when held horizontally, slide the shuttle forward *over* the thread between the first and second fingers of the left hand, then bring it back *under* the thread. The next move is the trick of tatting. Draw the shuttle sharply towards the right horizontally. Hold tightly and at the same time relax all the fingers of the left hand, so that a loop or stitch is formed on the shuttle thread, by the thread around the fingers.

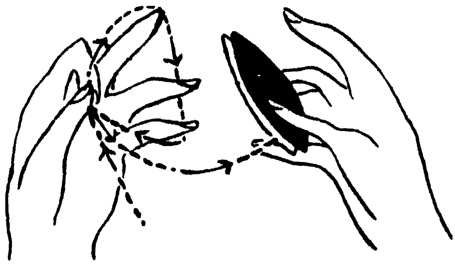


Fig. 1. Showing position of thread and shuttle before starting the work.

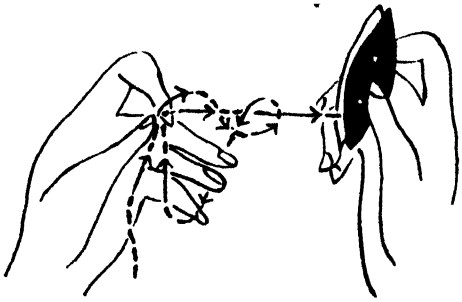


Fig. 2. Showing how the first half stitch is formed.

To make the second half of the stitch, slide the shuttle forward *under* the thread, bringing it back *over* the thread and through the loop formed by the thread around the right hand. Practise these stitches before going further, because an even tension is necessary for neat and accurate work.

Picots add much to the beauty of tatting, making it light and lacy. They are used for joining the rings and sections of tatting and make a great variety of designs possible. To make, merely leave a space of about ¼in. on the thread between two double stitches. Very long picots are not desirable, the shorter ones being neater and firmer and wearing better. Practice soon produces regularity in their sizes.

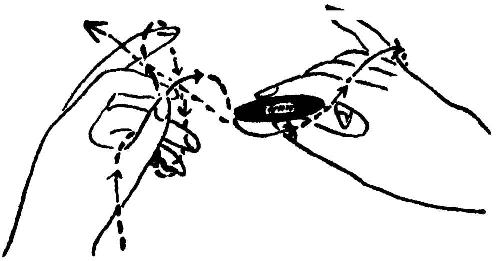


Fig. 3. Showing how second half stitch is formed.

One thread only is used when a design is composed entirely of rings, but two are required when there are chains as well in the design. Tie the ends of thread from shuttle and ball together. Make a ring. Turn the work downwards towards you and hold the second thread as for crocheting. Continue making stitches as before, being careful to make the loops on the ball thread and not on the shuttle thread. Picots are formed on the chains in the same way as on the rings. As before, practice is necessary to gain proficiency in the use of two threads.

Threads are joined by tying a neat firm knot as close as possible to the last ring. It will be more satisfactory if the loose ends are cut off later.

Buttonholing is, of course, the ideal finish for mounting tatting, but the same effect may be more quickly achieved if a line of ordinary machine stitching is run around closely to the edge of the linen, which can then be finely double crocheted without any danger of fraying.

Care should be taken when laundering the work, soapy water to which a little borax has been added, being necessary. It should be ironed when nearly dry, being covered with a thin cloth. An iron should never be rubbed over unprotected tatting as this causes the rings to turn, and spoils the effect of the design.

Almost as old as the art of tatting itself is the question as to whether tatting should be worked tightly or loosely. The answer is "tightly," for the whole charm of tatting depends upon the firmness and evenness of texture. It should be remembered that since tatting is quite different from any other needlecraft, patience, practice, and perseverance are necessary to acquire the knack of forming the stitches correctly. Tatting is such fascinating, beautiful work that the time devoted to practice will be well repaid.

Suggestions from Balumbah

A few months ago Mrs. A. Ellis (President of the Balumbah Women's Branch) suggested a symposium of special methods of phases of women's work. Her idea was that Branches be invited to discuss a given subject and then send in one composite paper explaining methods which obtained in their respective districts; all papers to be published in the same issue of the "Journal." This, it was thought, would make a splendid book of reference so that members moving to another part of the State would find the recorded experiences of others a great benefit. This sharing of ideas, too, would probably take practical forms in other directions.

The accompanying article by Mrs. Ellis elaborates what she had in mind.

Criticisms have frequently been expressed at various Congresses of the women's section of the *Journal*, so members of Balumbah Branch decided to offer something constructive, and accordingly sent various suggestions to the Editor. Some of the items suggested were impracticable at present, but more detail was requested concerning one innovation, hence this paper.

We suggest that at definite periods the matter submitted to the Editor may take the form of a symposium; every Women's Branch will consider one particular subject, and one paper outlining generally the methods suited to that district to be forwarded in time for all papers on the one subject to be printed simultaneously.

At present, if we wish to find information on any particular recipe or hint, it is necessary to hunt through many *Journals* and even then information may not be absolutely complete. We should be able to cope with any emergency with the aid of the *Journal.* Instead of having to rely on one person's opinions, we should have the proved and tried experiences of all the members of a certain Bureau, since the matter forwarded to the Editor would have been discussed and passed by the majority of the members, and the subject under discussion would be condensed and forwarded as one paper representing the ideas of many members.

To introduce this innovation, Branches could send in a list of information required and subjects would come under consideration in rotation according to their popularity. In writing about the specified subject members would give the most unusual and unique aspects, rather than take up useful space with the obvious.

In this way Branches can be helpful to each other, for although we are fortunate in being able to ask for and receive expert advice on all agricultural and domestic matters, we know that circumstances often prevent us from taking full advantage of this privilege. For instance, in feeding poultry, wheat is invaluable, but if rust, take-all, grasshoppers, mice or weevils have got in first, well we like to know how other women manage. If you live on an outback mallee farm with markets too far away to be profitable, you just don't agree with having nothing but pure bred poultry. It does not seem so grievous when a fox dines off a first cross, or when hordes of hungry relations troop along unexpectedly; you don't mind chopping off the heads of a few mongrels, but imagine roasting a "Parafield Paragon"! We know, too, that Black Orpingtons are splendid birds to keep, but if they will insist on dying during the summer, we like to hear what breeds other women keep in hot climates.

Subjects could include all sidelines (having special regard to marketing facilities), all branches of cookery, household management, care of children, and various activities for pleasure or profit.

One very important symposium would be a description of the various activities and opportunities in each district. How are you provided for in the way of schools, libraries, sport, doctors, hospitals, educational opportunities beyond the elementary school stage? What are the types of homes, distances from townships, population, &c.? In the event of members moving to other districts, they would be fully aware of the conditions awaiting them in their new home.

We might even have a record of special ability of individual members, so that we could write direct if we were in need of speedy information. For instance, we know that a member of the Belalie Branch makes beautiful rugs, and that a Snowtown member runs successfully an up-to-date poultry farm. Among the members of our own Branch one makes wool mattresses from their own sheep, another rears turkeys profitably, while another treats gypsum and uses it to make doorsteps, &c.

If this idea materialises, we shall soon be able to compile a most useful book of reference by preserving supplements on gardening, cookery, bee-keeping, pottery making, dressmaking, &c. Perhaps there might be a corner in the *Journal* where members could invite information which could be supplied direct to the questioner or to the Branch. For example, some time ago, a paper was discussed by a Men's Branch in the Hills on how to sell more fruit (their surplus was great), while some Women's Branches discuss the question of obtaining sufficient fruit for the needs of their children. Dietitians stress the maxim "Eat more fruit," but we all have one common enemy. Let us coordinate our efforts.

When we become familiar with special activities of other Branches, we might later exchange seeds, plants, sittings of eggs, &c., with mutual advantage. We have already had practical experience of thoughtful kindness which was greatly appreciated, for Balumbah women are finding joy in growing trees and shrubs from seeds sent by Rendelsham Branch.

We believe that this scheme will link Bureaux together more closely and create sympathetic interest and understanding of the difficulties and happiness of other members.

What do others think?

INDEX

Agricultural Bureau of South Australia
Index to Reports of Meetings

Page.

A

Alawoona Women's 384, 997
Allandale East 91
Appila 455, 674
Arthurton 888
Auburn Women's .. 196, 385, 467, 532, 750, 997

B

Balhannah Women's .. 196, 532, 678, 751, 997
Balumbah 474
Balumbah Women's . 196, 385, 532, 751, 997, 1013
Baroota 173, 875
Beetaloo Valley 91, 299, 674, 751
Beetaloo Valley Women's 196, 998
Belalie Women's 299, 467, 678, 998
Blackheath 885
Black Springs 673
Blyth 719, 894 993
Blewett Springs 668
Booleroo Centre 458, 673
Boor's Plains 84, 183, 300, 991
Boor's Plains Women's .. . 385, 467, 751, 998
Brimpton Lake 188, 191, 382, 466, 993
Brownlow 191, 375
Butler 887

C

Cambrai 269, 466
Carey's Gully 185
Clare Women's 196, 467, 532, 680, 751
Coonalpyn 181, 377
Coonalpyn Women's 385, 533, 998
Coonawarra 187, 533, 751
Coonawarra Women's 301, 385, 998

D

Devlin's Pound Women's 196

E

Echunga Women's 196, 301, 469, 534, 998
Eurelia Women's 301

F

Frayville 176

G

Georgetown Women's 196, 301, 469, 534, 751, 998
Gladstone Women's .. 386, 469, 535, 680, 752, 998
Goode 674
Green Patch 294, 987
Greenock 78
Gumeracha 171

Page.

H

Hartley 381, 450, 668, 992
Hilltown 179, 192, 674
Hope Forest Women's 197, 301, 386, 469, 752, 998

I

Iron Bank 885

K

Kalangadoo Women's 752, 998
Kangarilla Women's 386, 535
Karte 84
Karte Women's 197, 386, 469, 752, 892
Kilkerran 530
Koolunga Women's 197, 388, 536-7, 998
Koonunga 178
Koppio 187
Kyancutta 173, 986
Kybybolite 92, 379
Kybybolite Women's 301, 388, 537, 680, 752, 998

L

Laura Bay Women's .. 94, 198, 302, 470, 539,
680, 753, 999
Light's Pass 458
Lobethal 882
Lobethal Women's 388

M

MacGillivray 526
McLaren Flat 388, 597
McLaren Flat Women's 303, 470, 540, 753
Maltee Women's 302, 388, 540, 999
Mangalo Women's 540, 1000
Milang Women's 540, 681, 754, 1000
Millicent 180, 374
Millicent Women's 304, 388, 470, 541, 681,
754, 1000
Miltalie 458, 674
Monarto South 180, 182, 296, 529, 747
Monarto South Women's 198, 470, 541,
681, 754, 1001
Morchard 271, 377, 528, 542
Morchard Women's 305, 389, 470, 754
Mount Compass 811
Mudamuckla Women's 389, 470
Mundalla Women's 198, 755
Murraminga 983
Murraminga Women's 755
Myponga Women's 198, 389, 543, 681, 755, 1001

Page.

N

Nantawarra 172, 747
Narridy Women's 470, 544, 755
Nelshaby 746
Nelshaby Women's 198, 470, 755

O

O'Loughlin Women's 95, 544, 755, 1002
Owen 460
Owen Women's 470, 598, 756, 1002

P

Parilla Women's 598, 681, 756
Parrakie Women's 390, 470, 756, 1002
Paskeville 674
Penola 531, 989
Penola Women's 200, 305, 472, 756, 1003
Penwortham 527, 590
Pinbong Women's . 200, 306, 390, 544, 756, 1003
Pinkawillinie 462, 990
Pinnaroo Women's 305, 390, 472, 756, 1003
Poochera 880
Port Elliot 879, 985
Pygery 200

R

Ramco 984
Rendelsham Women's .. 201, 473, 544, 756, 1003
Robe 995
Roberts and Verran 171, 294, 524, 988

S

Saddleworth 193
Saddleworth Women's .. 201, 390, 544, 756, 1003
Sheoak Log Women's 201, 306, 473, 544, 681, 756, 1012
Smithville Women's 681

Page.

Snowtown Women's 306, 544, 756, 1003
South Kilkerran 181, 464, 808
Springton 189, 459
Strathalbyn Women's 544, 756-9, 1004
Sutherlands 298, 750

T

Tantanoola Women's 474, 545, 759
Taplan Women's 201, 546
Taragoro 465
Truro 675

U

Upper Wakefield 372

W

Waikerie 456, 890
Warcowie 172
Warcowie Women's 306, 545, 1004
Warramboo 995
Warramboo Women's 390, 474, 760, 1004
Wasleys Women's .. 201, 306, 390, 545, 760, 1005
Weavers 674
Wepowie Women's 306, 760
Whitwarta 673
Wilkawatt Women's 598, 1005
Williamstown 676
Willowie Women's 384, 598, 761, 1005
Wilmington Women's 201, 545, 598, 1005
Wirrabara Women's 201, 390, 474, 546, 761, 1005
Wudinna 459

Y

Yadnarie 184, 373, 381, 410, 529, 996
Yandiah 297, 376
Yandiah Women's 390, 474, 546
Yundi 526, 811

Authors

Page.

A

Adam, D. B., B.Sc.—
Barley Diseases in S.A. and Their Control 787
Plant Diseases in S.A., 1934-36 732
Silver Leaf Diseases in Orchard Trees .. 693
Aird, M. W.—
Parafield Egg-laying Competitions 47, 142
Alcock, E. S.—
Centaurea Nigrescens: A New Plant .. 44
South-East Pasture Competitions 591
Anderson, C. F.—
Chick Sexing 336
Does Poultry Keeping Pay at Present Prices? 650
Modern Methods of Incubation 419
Parafield Egg-laying Competitions .. 735, 874, 950-3
Feeding Tests .. 43, 140, 263, 340, 439, 514, 588, 663, 737
Apps, H. F.—
Herd Testing 502
Arndt, F. R.—
Review of 1936-37 Drying Season 696

B

Bagenal, B. W—
The Importance of the Wine Industry to South Australia 251
Baker, R.—
Some Aspects on the Management of Pigs 237
Barlow, H. B.—
Cream Grading and Cream Quality 510
Dairy Farm Competitions 943
Dehorning Cattle 700
Bowden, A. W.—
Cereal and Hay Statistics 924
Poultry, Livestock, and Wool Statistics 160, 792
Vineyard and Orchard Statistics 335
Bowden, O.—
Activities at Roseworthy Agricultural College 13
Breakwell, E. J., B.Sc.—
Activities at Roseworthy Agricultural College 111

C

Callaghan, A. R., D.Phil., B.Sc. (Oxon), B.Sc. Agric.—
Activities at Roseworthy Agricultural College 13, 111, 309, 935
Recovery of Wheat Prices and Some Reflections Thereon 916
Clark, G. H., B.Sc.—
Brassica Tournefortii: A Weed New to S.A. 699
Horehound 956
Wild Onion 795
Clifton, A.—
Parafield Egg-laying Competitions 142

Page.

Colquhoun, T. T., M.Sc.—
Barley Diseases in S.A. and Their Control 787
Cook, L. J.—
Development of Red Gum Lands 635

F

Follett, H. A.—
Murray Swamps Pasture Competitions . 741
Fowler, R.—
Removal of Spray Residue From Apples and Pears 411

G

Giles, R. C.—
Tobacco Growing 260, 861, 951
Grasby, C. G.—
Cincturing the Vine 966
Griffiths, R. L.—
Wheat Growing in the Mallee 844, 926
Wind Erosion in the Agricultural Areas 25

H

Hickenbotham, A. R., B.Sc., Dip. Ed., A.A.C.I.—
Tests of Quality Adopted to Handground Meals 135, 277
Hill, R.—
Agricultural Practices in the Hills: A Glimpse Into the Future 129
Dairy Farm Competitions 864
New Land Development 793
Points of Interest Concerning Kangaroo Island 562
Subterranean Clover: Its History in South Australia 322
Hutton, E. M., B.Sc.—
Wheat as a Foodstuff 944

J

Johnston, W. C.—
Widespread Aphis Attack on Artichokes 41

L

Leishman, E.—
Reworking Fruit Trees 124
Loxton, C. A., B.V.Sc.—
Stickfast Flea 869

M

McAuliffe, J. D.—
Adelaide Hills Pasture Competitions .. 570
McCann, C. F. G.—
Danish Pig Industry 949
Metters, F. H.—
Citrus Industry of America 222

O

Orchard, H. H.—
Candying Fruits 675
Reworking Fruit Trees 436

Page.

P

Perkins, A. J.—
Progressive Centennial Development in the Pastoral and Agricultural Industries of South Australia, 1836-1936 393, 477, 549, 601, 685, 769, 829, 897
Pollitt, C.—
Spray Plant and Materials 264

Q

Quinn, N. R.—
Celery Growing 497

S

Scott, R. C.—
Agricultural Exports 505, 612
Agriculture of New Zealand 3
Champion Wheat Crop Competitions, 1936-37 571
Export Lambs 318
Importance of Good Pasture Seed 842
Phosphatic Manures 664
Prickly Pear Eradication 404
Top-dressing Pasture Land 776
Turretfield Harvest Report, 1935-36 272

Page.

Spafford, W. J.—
Inaugural Wireless Talk Over 5CK 914
Strickland, A. G., M.Sc.—
Mottle Leaf in Citrus 45, 579
Removal of Spray Residue From Apples and Pears 411
Shipment of Dutchess Pears to United Kingdom 854
Swan, D. C., M.Sc.—
Insects Recorded in South Australia, 1934-36 717
Red-legged Earth Mite 946

T

Tisdall, A. L., B.Sc.—
Free-water Investigations in the South Australian Areas of the Murray Valley 487
Trumble, H. C., M.Sc.—
Some Factors Affecting Germination and Growth of Herbage Plants in South Australia 779

W

Waddy, F. E.—
Turretfield Harvest Report, 1935-36 .. 272

Index to Papers Read by Members of the Agricultural Bureau of South Australia

Page.

A

Agricultural Bureau, The .. 171
  Women's Branches Congress .. 383
    Conference, Pinnaroo Line .. 96
      Wasleys .. 762
Agriculture in Germany .. 86
Appila Harvest Report .. 674
Apples and Their Uses .. 385, 679
Apricots, Black Pieces in .. 984
    Disposing of the Crop .. 350

B

Babies, Care of .. 825
Baby Beef .. 879
Barley .. 707
Baume Content of Grapes .. 975
Beans, Preserving .. 754
Bee keeping .. 882-5
Beetaloo Valley Harvest Report .. 674
Blacksmithing .. 171
Blankets, Washing .. 388
Blewett's Springs Field Day .. 671
Blyth Seed Wheat Competitions .. 894
Booleroo Centre Harvest Report .. 673
Bracken in the South-East .. 799
Breadmaking .. 543
Breakfast Dishes .. 388
Building Hints .. 182
Butter making .. 206

C

Candying Fruits .. 675
Capital Invested in the Farm .. 184
Cement .. 995
Cereals—Disposing of Surplus .. 157
  in the Coonalpyn District .. 377
Cherry Growing .. 185
Chewing-gum—Removing From Clothes .. 390
Children—
  Bringing Up .. 817
  Entertaining .. 103
Child, The; the School and the World .. 62
Chrysanthemum Culture .. 537
Cincturing .. 966
Citrus Culture .. 890, 964
  Production for Export .. 52
  Recipes .. 304
City Versus Country Life .. 203
Clearing a New Block .. 993
Clothes, Old, and Their Uses .. 470
Concrete .. 996
  Troughs .. 382
Coonawarra Annual Report .. 187
Convolvulus Eradication .. 357
Cultivator Versus Plough for Fallowing .. 992
Currant Growing .. 527, 597
Curtains for Windows .. 767

Page.

D

Dahlia Growing .. 101
Dairying—
  Buttermaking .. 206
  General .. 152
  Sale of Cream .. 351
Decorating a Hall .. 301
Drainage, Orchard .. 980
Dried Fruits .. 208, 678
  Recipes .. 167, 468

E

Economic Disadvantages—
  Primary Industries .. 55
Economy in the Home .. 753, 755
Ensilage .. 346, 379, 885

E

Fallow Preparation .. 297
  Versus Grassland .. 108, 349
Fancy Work .. 204
Farm Buildings .. 84
  Home Beautifying, the .. 183
  Management .. 746
  Mutton Supply .. 765
Farmer of the Future .. 63
Feeding Livestock, Does it Pay? .. 159
Fencing .. 381, 458, 750, 798
Fern Growing .. 818
Fertilisers—Profitable Dressings .. 463
Field Management .. 706
Floral Work .. 813
Flowers, Gardening .. 300
    Keeping Cut .. 761
Fodder Conservation .. 91, 298, 379, 474, 985
Fodders and Grasses—
  Ensilage .. 346, 885
  Lucerne .. 363
  Rye Grass .. 987
  Subterranean Clover .. 987
Foot Rot .. 800
Frost Prevention .. 458, 968-72
Fruit, Trees, Vines, &c.—
  Advertising in Australia .. 150
  Apples and Their Uses .. 385, 679
  Apricots, Black Pieces in .. 981
    Disposal of .. 350
  Baume Content of Grapes .. 975
  Candying Fruit .. 675
  Care of Trees .. 294
  Cherry Growing .. 185
  Cincturing .. 966
  Citrus Culture .. 890, 964
    For Export .. 52
  Cold Storage .. 145
  Currant Culture .. 527, 597
  Drainage .. 980
  Dried .. 208, 467, 678

Page.

Fruit, Trees, Vines, &c.—*continued.*
  Frost Prevention .. 458, 968-73
  Lime for .. 367
  Preserving .. 474, 536
  Prune Drying .. 678
  Pruning .. 72
  Strawberry Culture .. 676
  Vines, Topping and Disbudding .. 456
Fumitory Eradication .. 993

G

Gardening .. 67, 94, 198, 300, 681
Geese-raising .. 197
Gifts, Selection of .. 101
Goode Harvest Report .. 674
Grassland *versus* Fallow .. 108, 349

H

Handfeeding Livestock .. 376
Harvesting .. 455
Hat Cleaning .. 106
Hay and Haymaking .. 524, 885
Health .. 95
Hessian, Uses of .. 750, 999
Hilltown Harvest Report .. 674
Holidays .. 762
Home and the Child .. 764
  Decoration .. 1002
Honey and Recipes .. 535, 1006
Horses—
  Care of Feet .. 995
  General Management .. 177, 296, 410, 875
  Sore Shoulders .. 81
  versus Tractor .. 179, 528
Household Hints .. 106, 386, 540, 680, 752, 754, 1001

I

Illustrations—
  Agriculture in Germany .. 86
  Bureau Display, Millicent .. 525
  Crutching Sheep .. 150
  Egg Tester .. 202
  Frost Combating .. 969
  Kybybolite Farmers' Day .. 532
  McLaren Flat Field Day .. 675
  Milk Float .. 677
  Non-Irrigated Bureau Conference .. 526
  Percheron Horse .. 78
  Ramps or Cattle Pits .. 808, 810
  Sheep .. 148
  Upper North Bureau Conference .. 85
Insects, Destructive .. 450
Insurance Against Climatic Damage .. 974
Irrigation .. 965
Invalid Cookery .. 96

J

Jam Making .. 759, 875
  Moulds on .. 390
Jelly Making .. 542, 815

K

Karte Women's Exhibition .. 892
Kilkerran Harvest Report .. 673
Knitting .. 303
Koppio Annual Report .. 186

Page.

L

Labour Saving Hints .. 467
Lambs for Export .. 529, 710
  Importance of Feed .. 180
Lime in the Orchard .. 367
Livestock Feeding .. 375
Lucerne .. 363
Lucindale District, Development of .. 92
Lunches .. 472

M

Mallee Farming .. 590, 993
  Farm Production Costs .. 354
  Scrub Destroying .. 362
Marginal Areas .. 60, 173
Marketing Farm Produce .. 69
  Hints .. 820
McGillivray Field Day .. 526
Meat Preserving .. 536
  Using to Best Advantage .. 103
Medicine Chest .. 823
Millicent Women's Exhibition .. 1000
Miltalie Harvest Report .. 674
Mineral Deficiency .. 992
Mount Compass Potato Competition .. 811

N

Nature's Remedies .. 819
Noxious Weeds .. 271
Nursing .. 208
Nutrition, The Problem of .. 821

O

Oats .. 378

P

Paskeville Harvest Report .. 674
Pasture Improvement .. 193, 373
  Species in the South-East .. 801
Pastures Sowing .. 374
Pasty Recipes .. 105
Pear Tree Pruning .. 72
Penola Field Day .. 531
Percheron Horse .. 71, 78
Pickles, Sauces, &c. .. 96, 751, 816
Pickling Meat .. 1001
Pigs and Cereal Growing .. 181
  Breeding .. 151
  For Market .. 365
  General Management .. 704
Plant Nutrition .. 56
Plough *versus* Cultivator .. 992
Polish for Cement .. 106
Potato Recipes .. 302
Poultry—
  Duck Raising .. 189
  Eggs—Frozen Whole .. 353
  Geese Raising .. 197
  General Management .. 389
  Incubation .. 201
Prune Industry .. 597, 678
Puddings .. 532

R

Rhubarb Growing .. 302
Rockeries .. 681
Rope Making .. 62
Rug Making .. 98
Rye Grass .. 987

Page.

S

- Saddleworth Dahlia Show 1003
- Salads 305, 539
- Sauces, &c. 96, 751, 816
- Scrub Clearing in the Hills 155
- Seeding 188
- Sewing Hints 386
- Sheep—
  - Blowfly 65, 180, 702
  - Dipping 466
  - Drafting Yard 144
  - Export Lambs 529, 710
  - Farmer, Problems of 747
  - Farming: Continuation Now That Wheat Prices Have Recovered 749
  - General Care and Management .. 59, 70, 147, 173, 526, 747, 983, 989, 990
  - Handfeeding 986, 988
  - Increasing Income From 459
  - In Relation to Area Fallowed 294
  - On a Wheat Farm 880, 991
  - Pure Merino Flock 715
  - Shearing 68, 190
    - Shed 377
  - Skins, Tanning 207
  - *Versus* Wheat in Marginal Areas 173
- Side Lines 465
- Slaughtering 191
- Smallgoods, Making 387
- Smocking 999
- Snowtown Women's Exhibition 1003
- Soap Making 761, 205
- Soil Erosion 360, 888
  - Fertility 711
  - Maintaining Organic Content 712
  - Treatment for Citrus 964
- Spinning 816
- Sponge Cakes 761
- Sport on the Farm 366
- Stains, Removing 106
- Strawberry Culture 676
- Sub-division *versus* Stock Raising 348
- Subterranean Clover 987
- Summer Drinks 534
- Sump Drainage 980
- Super, Profitable Dressings 462
- Sweets, Homemade 472

Page.

T

- Tatting (Illustrated) 1012
- Tobacco at Blewett Springs 671
- Tractor *versus* Horses 179, 528
- Transplanting 760
- Tree Planting 172, 181, 1002
- Troughs, Concrete 382
- Truro Harvest Report 675

V

- Vegetables, Preserving 197, 536
  - Value of 822
- Vine Products 753
- Vines, Topping and Disbudding 456
- Vitamins 821

W

- Wallpapers 1005
- Warcowie Women's Exhibition 1004
- Washing 1005
- Wastefulness 668
- Weavers Harvest Report 674
- Weeds, Noxious 713
- Wimmera Rye Grass in Wheat Crops 887
- Wheat—
  - Bulk Handling 192, 372, 460, 703
  - Growing Outside Goyder's Line 172
  - In Conjunction With Sheep 991
  - Seed 269, 529
  - *Versus* Sheep in Marginal Areas 173
- White Ants 464
- Whitwarta Harvest Report 673
- Window Treatments 757
- Women's Branches of the Agricultural Bureau, Suggestions for 546
  - Reports 1013
- Wool Classing 145
  - Profits When Sold at 1s. ℔. 530

Y

- Yundi Potato Competition 811

General

Page.

A

Advisory Board of Agriculture—
  Monthly Meetings .. 51, 342, 344, 521, 592, 668, 740, 804, 869
Agricultural and Pastoral Industries of S.A. (Perkins) .. 393, 477, 549, 601, 685, 769, 829, 897
Agricultural Bureau of South Australia—
  Balhannah Exhibit at Royal Show 451
  Branch to be Closed 342, 521, 804, 869
  Change in Name of Branch 342
  Conference Announcements 309, 392, 476, 548, 601, 685, 769, 828, 896
    Dairying Districts 874
    Eyre's Peninsula Branches 49, 338, 339, 954
    Hills Branches 167
    Lower North Branches 666
    Lower South-East Branches 739
    Middle North Branches 667
    Murray Lands East Branches 339
    Murray Lands West Branches 49
    Non-irrigated Fruitgrowing Districts . 338
    Pinnaroo Line Branches 50
    River Murray Branches 955
    Southern Branches 166
    Upper North Branches 50
    Upper South-East Branches 738
    Yorke Peninsula Branches 738
  Congress, 47th Annual 213
    Women's Session 203
  Life Members 51, 342, 345, 521, 592, 668, 740, 804
  New Branches and Members .. 51, 342, 521, 592, 668, 740, 804, 869
Agricultural Experiments (see also Roseworthy College) 505, 612
  Practices in the Hills 129
Albert Crop Competition 442
Alfred Crop Competition 443
Analyses of—
  Arsenate of Lead 594
  Barley 133
  Cabbage 123
  Chou Moellier 123
  Fertilisers 652
  Maize 594
  Oats 133, 594
  Rye 133
  Sudan Grass 594
  Turnips 133
  Wheat 133
    Dry Pickles 24, 716, 860
Appila-Yarowie Experiments 506
Apple Scab 331
Apples—Removal of Spray Residue 411
Apricot Scab 733
Arsenate of Lead Analyses 594
Arsenical Sprays 287
Artichokes Attacked by Aphis 41
Asphodelus fistulosis 795

Page.

B

Balaklava Crop Competition 442
Barley—
  Analyses 133
  Diseases 787
  Feeding to Horses 134
    Pigs 42
  Its Rooting System 250
  Smutty, Feeding to Live Stock 165
  Variety Trials, R.A.C. 121
  Versus Oats for Lambs 42
Blowfly Strike in Sheep 775
Bordeaux Mixture 265
Brassica Tournefortii, a New Weed 699
Brownlow Experiments 620
Budding Fruit Trees 436
Burgundy Mixture 266
Butter—See Dairying
Buxton Crop Competition 444

C

Cabbage Analysis 123
Canary Grass 588
Celery Growing 497
Centaurea Nigrescens, Willd 44
Central Crop Competition 443
Ceresan Dry Pickle 716
Chandos Crop Competition 448, 844, 926
Cheese—See Dairying
Chick Sexing 336
Chou Moellier, Analysis 123
Citrus Fruit Mould 627
  Industry of America 222
Codlin Moth Chemical Bandages 236
Cook, L. J., Appt., as Experimentalist .. 334
Copeville Experiments 622
Copper Carbonate Analysis 24
Corny Point Experiments 615
Cow Ailments and Diseases — See Stock Troubles
Cream Grading 510
Crickets 720
Cultivation Experiments, R.A.C. 121
  Practices in the Mallee 926
Curculio Beetle 725

D

Dairy Cattle and R.A.C. 315
  Farm Competitions, Hills 864
    Murray Swamps 943
Dairying—
  Butter and Cheese Monthly Production 143, 321, 451, 501, 634, 863
  Cream Grading and Quality 510
  Herd Testing, Mount Barker 333
    (Apps) 502
    Review of 871
  Tubercle-free Herd Scheme 418
Danish Pig Industry 949
Dehorning Cattle 513, 700, 913

Page.

- Department of Agriculture, Changes in Staff .. 334
- Dipping Bath for Horses .. 434
- Docking Lambs .. 778
- Drainage and Free Water .. 493
- Dry Pickles, Analyses .. 24
- Ducks—See Poultry

E

- Eggs—See Poultry
- Ensilage and R.A.C. .. 17
- Erosion, Wind (Griffiths) .. 25

F

- Fallowing .. 716
  - Methods in the Murray Mallee .. 927
- Far Northern Crop Competition .. 444
- Flinders Crop Competition .. 520
- Fertilisers and Manures—
  - Analyses .. 652
  - Experiments .. 612
    - Kybybolite .. 639
  - Manganese Sulphate Experiments .. 616
  - Phosphatic .. 664
  - Statistics .. 336
  - Super., and Sul. of Amm. Mixture .. 794
    - Residual Effect .. 644
- Foal, Weaning .. 74
- Fodders and Grasses—
  - Chou Moellier .. 123
  - Ensilage .. 17
  - For Horses and Cattle .. 133
    - Soil Erosion .. 32
    - Swamp Lands .. 221
  - Germination and Growth of (Trumble) .. 779
  - Lucerne .. 24
  - Subterranean Clover .. 322
  - Sudan Grass .. 593
- Free Water Investigations in the Murray Valley .. 487
- Frost Prevention .. 162
- Fruit, Trees, Vines, &c.—
  - Apples, Removal of Spray Residue .. 411
  - Budding .. 436
  - Citrus Industry of America .. 222
  - Frost Prevention .. 162
  - Grafting .. 124
  - Pears, Removal of Spray Residue .. 411
    - Shipment to United Kingdom .. 854
    - Storage Trial .. 856
  - Reworking .. 124, 436
  - Spraying .. 264
  - Statistics .. 335
  - Sultanas, Olive Oil Emulsion for Dipping .. 592
  - 1936-37 Drying Season .. 696
- Fruit, Trees, Vines, &c.—
  - Pest and Diseases:
    - Apple Scab .. 331
    - Apricot Scab .. 733
    - Black Spot of Vines .. 74
    - Codlin Moth .. 236
    - Curculio Beetle .. 725
    - Diseases .. 732
    - Mottle Leaf in Citrus .. 45, 579
    - Mould in Citrus .. 627
    - Silver Leaf .. 693
    - Walnut Black Spot .. 734

G

Page.

- Germination of Herbage Plants .. 779
- Grafting Fruit Trees .. 124
  - Grass Lands Congress .. 587
- Grindstone, How to Make .. 161

H

- Hand Ground Meals and Tests of Quality .. 277
- Hay Stacks, Protection of .. 15
  - Variety Trials, Roseworthy Agricultural College .. 120
  - Yields, Roseworthy Agricultural College .. 13
- Herd Testing (Apps) .. 502
  - Mount Barker .. 333
  - Review of .. 452
- Horehound .. 956
- Horses—
  - Ailments and Diseases, See Stock Troubles.
    - At Roseworthy Agricultural College .. 309
    - Dipping Bath for .. 434

I

- Illustrations—
  - Agricultural and Pastoral Industries of S.A. .. 393-403, 477-86, 549-61, 601-11, 685-91, 829-38, 897-913
  - Agriculture in New Zealand .. 3-9
  - Apparatus for Testing Gas Production in Dough Balls .. 136
  - Apple Scab .. 331
  - Barley Diseases .. 288
  - Breakdown in Pears .. 854
  - Budding Fruit Trees .. 436-9
  - Bureau Conference, Lower North .. 666
    - Middle North .. 667
  - Celery Growing .. 497, 501
  - *Centaurea nigrescens, Willd.* .. 44
  - Chou Moellier .. 123
  - Cincturing the Vine .. 966-7
  - Citrus Industry of America .. 222-34
  - Dairy Field Day, Lobethal .. 841
  - Dipping Bath for Horses .. 435
  - Ensilage Making .. 347
  - Export Lambs .. 318-20
  - Free Water Investigation .. 484-95
  - Frost Prevention .. 162-5
  - Hay Stacks, Mouse-proofing .. 15, 16
  - Horehound .. 956, 957
  - Incubation .. 420-33
  - Insects in S.A. .. 717-30
  - Kangaroo Island .. 568
  - Mottle Leaf of Citrus .. 580-5
  - Pasture Development in the Hills .. 129-32
  - Pig Management .. 237-49
  - Prickly Pear Eradication .. 404-9
  - Red-legged Earthmite .. 946-8
  - Reworking Fruit Trees .. 124-8
  - Roseworthy College—
    - Activities .. 13-22
    - Crop Inspection .. 112
    - Harvesting Stud Wheats .. 117
    - Horses .. 310, 311
    - Sheep .. 312-4
    - Silage Harvest .. 17-21
    - Sword Wheat .. 114
  - Silver Leaf .. 694
  - Spray Plant, &c. .. 264
    - Residue on Apples .. 411-7

Page.
Illustrations—*continued.*
  Subterranean Clover 322-30
  Turretfield Farm 272-5
  Wheat Crops in Championship Competition 574-8
    Growing in the Mallee 926-34
  Wild Onion 795
  Wind Erosion 26-39
  Wine Industry of S.A. 252-4
  1936-37 Drying Season 697, 698
Incubation, Modern Methods (Anderson) .. 419
Irrigation and Free Water 490
Insects Recorded in S.A. 717

J

Jervois Crop Competition 447
Johnson, W. C., Appointment as Manager Kybybolite Experiment Station 334

K

Kangaroo Island, Some Points Concerning (Hill) 562
Keith Experiments 625

L

Lambs for Export 141, 318
  Tailing and Docking 778
Legumes in Pastures 780
Le Hunte Crop Competition 444
Lime Sulphur 266
Linseed 588
Lucerne 24
  Flea 722
  Seed Germination 221

M

Maltose Production 277
Manganese Sulphate Experiments 616
Marribum Vulgare 956
Meals, Handground for Tests of Quality .. 135
Midlands Wheat Crop Competition 519
Mid-North Wheat Crop Competition 145
Mistletoe and Opossums 786
Mottle Leaf in Citrus 45, 579
Moulds in Citrus Fruit 627
Mouse-proofing Hay Stacks 15

N

Nelshaby Experiments 508
New Land Development in Better Rainfall Areas (Hill) 793
New Zealand Agriculture (Scott) 3
Nicotine Sulphate Spray 268
Northern Crop Competition 447
  Yorke Peninsula Crop Competition 446

O

Oat Variety Trials, Roseworthy Agricultural College 120
Oats Analysis 133
  Crops Recommended for Seed 450
  Versus Barley for Lambs 42
Oil Sprays 267
Over Cropping of Wheat Lands 921
Opossums and Mistletoe 786

Page.

P

Pastoral and Agricultural Industries of S.A. (Perkins) 393, 477, 549, 601, 769, 829, 897
Pasture Competitions—
  Adelaide Hills 570
  Murray Swamps 741
  South-East 591
Seed Certification 512
Pastures, Importance of Good Seed 842
Pea Growing 258
Pears, Removal of Spray Residue 411
  Shipment to United Kingdom 854
Phosphatic Manures 665
Pig, Ailments and Diseases (*See* Stock Troubles)
  Danish Industry 949
Pigs at Roseworthy Agricultural College .. 315
  In New Zealand 3
  Management (Baker) 237
  Market in Great Britain 210
Plant Diseases in S.A. 732
Poultry—
  Chick Sexing 336
  Ducks, Feather-eating 496
  Egg Laying Competitions, Parafield .. 270, 340, 440, 515, 661, 735, 874
  Eggs—Feeding to Pigs 250
  Prices for Export 649
  Feeding Tests, Parafield, .. 43, 140, 340, 439, 514, 663, 737, 797, 873, 954
  Hens, Eating Eggs 159
  Keeping at Present Prices 650
  Modern Methods of Incubation (Anderson) 419
  Wheat *versus* Bran Mash for 368
Prickly Pear Eradication (Scott) 404
Pruning Competitions, McLaren Flat 959
  River Murray 960

R

Rainfall—
  Appila 506
  Chandos District 847
  General 75, 168, 291, 369, 453, 522, 595, 669, 743 805, 876, 961
  Kangaroo Island 564
  Nelshaby 508
  Turretfield 273
Ramps or Cattle Pits 808
Rations for Pigs 247
Red Gum Lands, Development (Cook) 635
  Legged Earth Mite 722, 946
Re-working Fruit Trees 124, 436
Roseworthy College Activities 12, 111, 309
  Cereal Breeding 117
  Crop Results 935
Royal Agricultural and Horticultural Show, Bureau Exhibit at 289
Rugging Sheep 314
Rye, Analysis of 133

S

Seed Certification 512
  Importance of Good Pasture 842
Seeding Operations in the Mallee 929

Page.

- Sheep—
  - Ailments and Diseases (*see* Stock Troubles)
  - At Roseworthy Agricultural College 312
  - Lambs for Export 318
  - Rugging 314
- Silver Leaf on Orchard Trees 693
- Slugs 730
- Snails 730
- Soil Erosion by Rain 716
  - Wind 25
  - Temperature and Germination 782
- Soils of the Chandos District 846
- Southern Crop Competition 445
  - Yorke Peninsula Crop Competition 448
- South Kilkerran Experiments 615
- Soya Beans, Growing in Mallee Areas 42
- Spraying Fruit Trees 265
- Spray Residue Removal From Fruit 411
- Statistics—
  - Cereals and Hay 141, 924
  - Citrus Industry of America 234, 235
  - Eggs and Egg Products 160, 792
  - Fertilisers 336
  - Kangaroo Island 568, 569
  - Livestock 160
  - Orchard and Vineyard 335
  - Wine 256, 257
  - Wool 161
- Stickfast Flea 727, 869
- Stock Travelling Waybills 870
- Stock Troubles—
  - *Cattle*—
    - Forage Poisoning 796
  - *Foal*—
    - Weaning 74
  - *Horses*—
    - Lice and Dipping Bath 330, 434. 651
  - *Pigs*—
    - Sow Losing Milk 134
  - *Sheep*—
    - Blowfly Strike 775
    - *Entero Toxaemia* 651
    - Foot Rot 800
    - Pink Eye 585
- Stubble, Ploughing in to Stop Drift 43
- Stud Stock Purchases 50
- Sudan Grass 593
- Sultanas, Olive Oil Emulsion for 572
- Sulphate of Ammonia Super, Fertiliser 794
- Superphosphate, Residual Effect 644
- Subterranean Clover, History in S.A. 322

Page.

T

- Tailing Lambs 778
- Tar Distillate Sprays 268
- Tatiara Crop Competition 518
- Teatree Itch Mite 729
- Temperatures on Kangaroo Island 564
- Tobacco Growing 260, 861, 951
- Top Dressing Pasture Lands 776
- Tubercle-free Herd Scheme 418
- Trees for Wind Breaks 35
- Turnips Analysis 123
  - Club Rot 403
- Turretfield Seed Wheat Farm 272, 309

U

- Ungarra Experiments 617
- Urania Experiments 612

V

- Vines, Black Spot 74

W

- Walnut, Black Spot 734
- Waybills for Travelling Stock 870
- Way Crop Competition 442
- Wheat, Analysis of Green Growth 133
  - As a Foodstuff 944
  - Breeding at Roseworthy Agricultural College 113
  - Crop Competitions—
    - Chandos, a Review of 844
    - Champion Crop, 1936-37 571
    - Government Assistance 997
    - Seed From 449, 450, 517, 586
    - 1936-37 Competitions 442-8
  - Deterioration of Formalin Treated Seed 143
  - Dry Pickles 716, 860
  - Growing in the Murray Mallee (Griffiths) 844, 926
  - Growing in New Zealand 4
  - Overseas Quotations 392, 476, 548, 601, 685, 769, 828, 896
  - Prices at Port Adelaide and Thevenard 46
  - Prices, Recovery of 917
  - Stocks in Reserve 918
  - Variety Trials, Roseworthy Agricultural College 118
  - Varieties in Chandos District 848
- Whole Meal Fermentation Tests 135
- Wild Onion 795
- Wind Erosion 25
- Wine Industry of S.A. 251
- Wireless Talks Over 5CK 914
- Wool, "Colonial" Skin 11
  - Dead 11
  - Statistics 161

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